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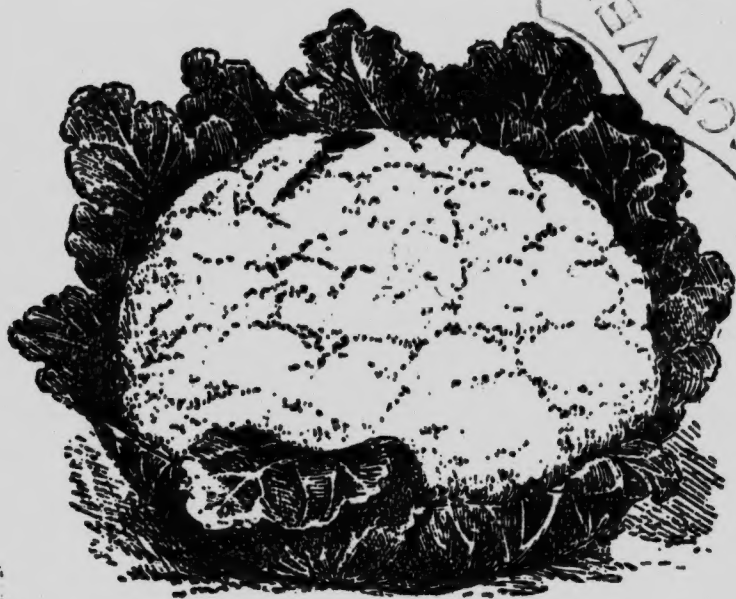
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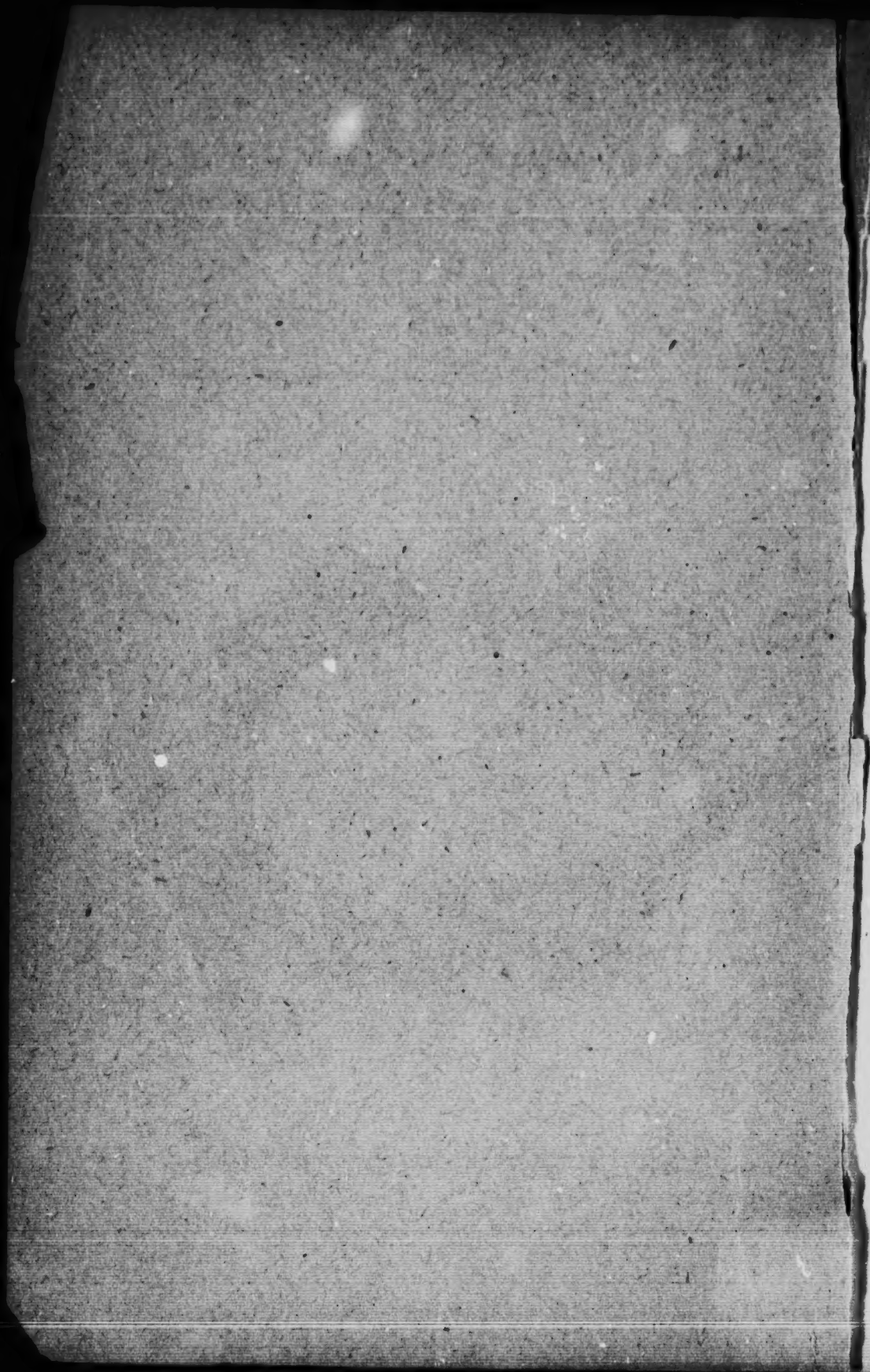
***The* FARMER'S VEGETABLE FRUIT *and* FLOWER GARDEN**

by ALEC SANSTERRE • Revised and enlarged by
GEORGE MOORE, assistant editor of the Province
of Quebec *Journal of Agriculture and Horticulture*



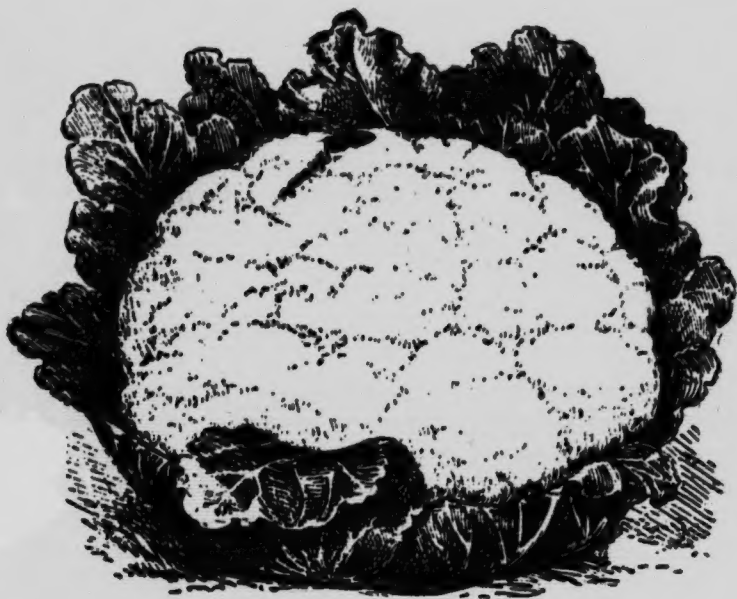
QUEBEC, 1903 — Press of THE DAILY TELEGRAPH

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***The* FARMER'S VEGETABLE FRUIT *and* FLOWER GARDEN**

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REGISTERED according to the Act of Parliament of Canada, in the year
nineteen hundred and three, in the office of the Minister of Agriculture at Ottawa.

PREFACE

A knowledge of gardening and more especially of vegetable gardening, is of indubitable advantage in a country life.

Apart from the fact, that, for the proper working of a farm, the cultivation of the common roots, alternately with the cereals, fodder and other commercial growths, has been followed from time immemorial, there is hardly a farmer who does not see the necessity of devoting a certain portion of his land, be it big or small, to the cultivation of kitchen vegetables for the daily use of his family.

In most cases, the farmer himself takes charge of the management of the garden, either entirely or to a very great extent. He should therefore have at least the most ordinary knowledge of gardening to be enabled to practise it successfully.

In preparing the present manual, we make no pretension to the composition of a complete treatise on gardening. Such would be beyond our object, and besides the extent of such a work would be greater than our prescribed limits. We have been obliged to confine ourselves to general principles, still, however, in sufficient detail to direct the beginner, while at the same time leaving to his intelligence the perfecting of our instructions wherever omissions may be found.

After referring to certain fruit trees which are properly found in a vegetable garden, we will conclude the present treatise by a chapter on the cultivation of flowers. Ornamental plants are of no real utility in the proper acceptation of the word, but they delight the eye and give repose to the senses, and the inhabitants of the fields are not more insensible to the charms of flowers than are those who dwell in

the towns. We have, however, been obliged to devote but a very small space to this portion of our book and to limit ourselves to such ornamental kinds as will grow in the open air in our climate and more particularly to those the cultivation of which requires only the most ordinary process of gardening. We hope that this little work will be of use, not only to the settlers and farmers, far removed from the cities, but also to all such persons as have a small corner or plat of ground near their dwellings, as is the case in almost all of our villages. By following our instructions benefits will follow which will be more fully appreciated when realized.



THE VEGETABLE GARDEN

FIRST PART

GENERAL INSTRUCTIONS ON GARDENING

CHAPTER ONE

Definition of gardening — Where gardening and agriculture proper come together — The different plans of gardening and their characteristics — Descriptions of the vegetable garden, the fruit garden and the flower garden — General conditions of the soil in all horticultural and agricultural operations.

Gardening is that branch of the science of agriculture, the object of which is the creation and cultivation of gardens. The garden, to a certain extent, may be put into comparison with the farm since the object of both is the production of articles of consumption and that the working of both systems is governed by rules common to each. In fewer words it might be said that gardening is agriculture on a small scale and that agriculture is an extended system of gardening.

This definition is so near the truth, that notwithstanding the meaning generally attached to these two words, it is often difficult to say whether a certain tilling of the soil belongs to gardening or to agriculture. By restricting the

definition to the principal characteristics of a garden, properly so called, it may be said "a garden is a field of moderate size generally surrounded by a fence, in which the work, except in some particular instances, is performed without the assistance of domestic animals and where all agricultural products are grown, except fodder and cereals."

Gardens vary largely in their general lay out and cultivation, two conditions which are always in keeping with the nature of the crop to be produced. Still, whatever their shape, their extent or the nature or character of the cultivation carried on, they may be all included in these different kinds, the kitchen or vegetable garden, the orchard or fruit garden and the parterre or flower garden.

The vegetable garden as its name indicates is especially devoted to the cultivation of vegetables; and if the crop is intended for sale, in some localities it is called a market garden. The produce of a vegetable or market garden consists of all vegetables which are eaten either cooked or raw, they include roots, the stems and the leaves and also the fruit, as for example, the fruit of the pumpkin which is only eaten after having undergone the process of cooking; that of the melon, the strawberry, the tomato and the cucumber, which require no artificial preparation. The orchard or fruit garden differs from the vegetable garden in that its products consist of the fruits of certain trees which, to secure all their valuable qualities, should receive very particular care, among such are the pear, the apple, the plum, the apricot, the peach, etc., which are intended for the use of the table.

But gardens are not prepared solely for the material requirements of life, they are also laid out for the pleasure of the eye; such as the flower garden or parterre which is reserved exclusively for the cultivation of flowers and other ornamental plants; it is generally small in size and is always laid out in the immediate neighbourhood of the dwellings. The line is not always very distinctly marked, between the different kinds of gardens mentioned above.

As an example of this the vegetable garden often contains a certain number of fruit trees which far from being injurious to the vegetables are often of very great advantage to them owing to the shade which they throw around them, as shown in most of the gardens of the old continent. There in the fruit gardens or orchards, various vegetables are cult-

ivated between the trees by which means the spaces of land which otherwise would remain unproductive are utilized most advantageously. In fact there is no more common sight than to see flowers growing among the vegetables and fruit trees and decorating the borders of the principal walks in the garden.

It must not be understood by this that very large spreading fruit trees are to be planted in the garden, properly so called, because no vegetables will thrive in the shade. In orchards, vegetables are often grown between the rows of trees, but not where they will be shaded by them. Neither are flowers grown among the vegetables, but only in the borders on each side of the main alleys.

OF THE SELECTION OF SOIL

In gardening, as well as in farming, the nature of the soil, should be a matter of the first consideration, for, whatever plants may be cultivated, whatever method of cultivation may be followed, good ground will always yield larger returns and always of better quality than will be obtained from an inferior soil. Both in the operations of gardening and farming, a deep soil, rich in mould, permeable to the air and to water and easily worked is always to be preferred to a tough adhesive soil, or one of little depth or light in character. But these choice lands; which, so to speak, require nothing but sowing and planting to yield abundantly, are not always to be found. Generally soil is defective in some particular, at one place it contains too much clay and is too compact, it chokes the plant and does not allow the air to get to the roots, or else it stops the water from rain or irrigation and becomes damp, in other localities, on the contrary it contains too great a proportion of silicious sand, and besides the unfruitfulness which is the result, its lightness causes it to dry up under the lightest rays of the sun and prevents it from retaining fertilizers which may be employed. At other places again an impervious sub-soil renders the land unproductive; lastly the mineralogical constitution of the land may be of such a nature that it does not contain the ingredients which enter into the composition of the plants. In any case a

similar manner for remedying these defects is generally followed both in farming and gardening.

But whatever means may be followed, be they good or bad, the remedying the defects in the soil is not every thing, they exhaust the soil by the crops taken from it and manures must be constantly applied to restore the fertility of which it has been deprived. Manuring the ground is not less necessary in the garden than in the farm. It might even be said, it is more necessary, since within a given time and from an equal extent of land, much more is expected from the garden than from the farm.

CHAPTER TWO

The vegetable garden and the principal conditions of its establishment—
Situation in the near neighbourhood of the dwelling—Extent and exposure—Effects of various exposures—The slope of the ground—Its advantages and disadvantages—Shelter from the wind—Fencing, dead and green hedges—Necessity for water in a vegetable garden and the manner of obtaining it.

The vegetable garden is the one above all which supplies the most directly useful produce. It may be said to be the perfection of all agricultural operations; and to it these lessons will be exclusively devoted.

Situation.—Its natural position is in the immediate vicinity of the dwelling, either because the articles of food which it supplies are in constant use by the household, and these articles should be easily procurable at all hours of the day; or because the particular work required can be more conveniently carried on, or finally because its produce, either fruit or vegetable is in this way less exposed to the depredations of thieves or domestic animals.

Extent.—Its extent or size should be in proportion to the wants of the household; the size of the garden should therefore be calculated from the quantity of vegetables that the house may require; often the larger vegetables may be grown elsewhere and the necessary size of the garden will be reduced accordingly. A large garden is always a heavy charge, a smaller extent of garden land, with good soil and

well kept will often be more productive than a large garden with only a medium soil and poor cultivation. Without fixing the exact limits, generally speaking, the size of a vegetable garden varies from half an acre downwards, according to the number of persons composing the family and also according to the favorable or unfavorable conditions available.

Exposure.—The exposure or aspect of a vegetable garden and particularly of an orchard is a matter of important consideration, as it largely influences the success of the operations. It varies according to climate and locality and all circumstances should be taken advantage of, to do whatever may be for the best.

The best is the one which favoring the growth of the greater number of the plants, protects them from the extremes of temperature common to the locality or from the predominating winds. A southern aspect approaches nearest to the conditions required in our country, where vegetation is rapid and where the North East winds are to be feared.

The slope of the land is closely connected with the exposure and is to a certain extent identical with it. A gentle slope with a good exposure is an advantageous condition; besides it facilitates watering and draining. A heavy slope or decline in the land would be quite a different thing, especially if added to an unfavorable exposure.

Shelter.—In every case, man's industry and intelligence must come to the assistance of nature by correcting as far as possible the defects to be found in any exposure, by artificial screens or shelters. These shelters generally consist of fences which protect the garden from the inroads of animals and are besides this, favorable to the growth of certain crops—screens of growing trees are often added, which from the thickness of their foliage, are most useful in opposing a barrier to the winds.

Fences.—Garden fences are in general formed of walls or hedges. The latter cost less than the walls at the first, but there are many disadvantages connected with them. In the first place a dead hedge only lasts a short time and must be renewed every four or five years and sometimes oftener—then again if they are a barrier to domestic animals, they are no bar to animals of the rodent breeds, such as rats, mice,

moles, etc. Green or quickset hedges are virtually everlasting, but they are slow in growing, always take up a great deal of space, require a great deal of attention and are a poor protection after all, as they very soon become thin at the foot and give easy passage to destructive animals. Their roots also encroach on the garden and do a great deal of harm, to cultivation.

Masonry walls, in earth, stone or brick, well plastered, form the best enclosures for gardens. They, no doubt, cost more than hedges, but this disadvantage is very soon compensated by the successful crop to which they contribute, without mentioning their other advantages, such as the length of time they will last the perfect shelter which they afford from the prevailing winds, and their complete harmlessness to all plants grown in their vicinity.

A garden wall is generally built from two to three yards in height, but this rule is not absolute. For a small narrow garden and more particularly in the case of a garden in the form of a long parallelogram, a wall of this height would throw too much shade. Besides this the wall should not be the same height the whole way round the garden, the highest part should be on the north side or on the side facing the most prevalent winds; the other part should be lower, especially that part facing the south or other point of the compass nearest to it. A mere protecting wall will be sufficient and it may even be replaced by a quick set hedge. The object of this arrangement is to allow as much sun as possible to enter the inclosure.

Watering.—Water is a thing of the first necessity in a vegetable garden. In fact in almost every kind of garden, for without it, there can be no watering and as a consequence, on vegetables. Before laying out a vegetable garden anywhere, it should be assured that there will be no failure of water at any season of the year. Should there be no water in the vicinity it will be necessary at least to have a well, which, without being too deep, will not be liable to run dry. As far as possible the well should be sunk in the highest part of the ground, for by this arrangement, the water being enabled to run through pipes to the lower levels, if the garden is a large one, the watering will be greatly facilitated. For drawing the water, a hand pump is generally used, where

there is none, a bucket will do. Later on we will return to the important question of watering when we treat in detail of the various vessels and implements employed in carrying it on.

CHAPTER THREE

Principal varieties of soil — Division of into the arable bed and sub-soil —

Mould, its properties — Process by which the defects in soil are corrected and exhaustion remedied — Improvement of soil and manures.

Description of, particular characteristics—Examination of the various substances most generally employed for improving and manuring land.

It is from the soil that plants derive, if not the whole, at least the greater part of the elements which enter into their composition. This one remark is sufficient to establish the importance of soil in connection with cultivation.

The composition of the soil is exceedingly variable, — even in the narrow space of a garden the greatest differences are found at different spots. It is not alone on the quantity but also on the quality of the produce that these different kinds of soil exercise their influence. In the same proportion as the facility and success of cultivation in good soil, is the difficulty and failure in bad; in the latter case every effort is made to correct its defects, by manuring. But remedying the defects in a poor ground is not everything; the very best soon becomes exhausted through the mere fact of cultivation and this is easily understood, since the various parts of vegetables are formed from the substances which they pump from the soil through their roots, the total of the elements of fertility are necessarily diminished by each successive crop. The fruits, roots and leaves which we gather from the surface of the field, are in reality the primitive material contained in the soil, condensed and transformed by the vital force of the plants, the time at last arrives when the land can no longer furnish anything to vegetation. It is by the use of manures that this impoverished condition is obviated; they restore to the land proportionately what we take from it in produce of every kind. From the little already said, it will readily be seen that the proper employment of manures is one of the most essential parts of the

work of the farming industry, both in the garden and on the farm.

Arable bed, Sub-soil, Mould.—The soil may be considered as formed of two superimposed beds, the one on top which is the Arable soil, the other underneath which is the sub-soil, both fill an important part in the carrying on of agricultural operations.

The arable bed comprises all the thickness of ground through which the roots force their way downwards and which furnishes the material for their nourishment, it is also this arable bed of earth which is broken up by the various ploughing implements which are used in the tilling of the ground. Its colour is generally darker than that of the sub-soil; which fact is due to the presence of mould or vegetable earth, with which it is mixed. This latter is of an organic origin and results from vegetable and animal remains, more or less decomposed. It is generally the richest part of the soil and the crops are abundant in proportion to the thickness of the arable soil and the vegetable mould.

The sub-soil begins at the extreme point reached by the roots of cultivated plants. It may be said to have no limit to its depth, it is not always clearly distinguishable by its colour or composition from the arable bed which lies above it. Although furnishing but little nourishment to vegetation, it still exercises a great influence on cultivation in accordance with its permeability to water. It is always an unfavorable condition when the sub-soil does not permit of the easy flowing away of the water and this condition is aggravated when the arable layer is only of a slight thickness. This disadvantage is remedied to a certain extent by the digging, at certain fixed distances, of drains or furrows for the running off the surplus water, an operation known in agriculture as drainage and which is affected in various ways, either by trenches open to the sky, or by pipes covered up in the ground.

Improvement and Manures.—To improve and lighten the soil is to correct its mineralogical nature, so as to give it the mechanical qualities in which it is defective, such as a certain degree of lightness or of toughness, a greater permeability to air or water; to enrich it, to manure it, that is to add to it new elements of fertility, to furnish it with mate-

rials organic or inorganic which go to the composition of plants. We will sum up in a few lines the principal agents for improving or enriching land which may be found of value in a garden.

IMPROVING.—There is no clearly defined line between objects for improving, or those for enriching the soil. If certain articles used for the improvement of the soil act only mechanically upon it, there are others, such as ashes, leached ashes, soot, plaster, &c., which, while lightening the soil, at the same time communicate to it principles of fertility analogous to those furnished by manures properly so called, that is substances which are taken up by the plants and go directly to their nourishment.

The following are the principal objects used for the improvement of land :

a. Artificial soil.—The ground itself often acts as an improver, either by the spreading of soil of good quality upon one of inferior quality or by the mixture of soil of different qualities, so that the one may correct the other. Excavations and the making of embankments which are frequently necessitated on a farm or even on the more circumscribed space intended for a garden, may often cause an improvement of this nature. As an example, a vein of sand is of use in reducing the toughness of a soil containing too much clay. Strong ground on the contrary will be used to diminish the too great porousness of a sandy soil and without firmness.

b. Lime.—Lime is employed with great advantage to correct cold clay soils.

The proper quantity to be used to the acre will necessarily vary according to the condition of the ground to be improved. Liming is an operation which can only be properly learned by experience.

c. Plaster and rubbish.—These things, on the contrary, are frequently used in gardening on account of the salts which they generally contain.

They are particularly useful in the cultivation of cabbage and other cruciforms, beets, spinnage, sorrel and of many other plants both useful and ornamental.

d. Soot.—Soot is valuable as a garden dressing for two separate purposes : in the first place it is an excellent manure and secondly because it causes the death of large numbers of destructive insects. It should only be used in small quantities diluted in water, in which case it should be applied to the plants at the time of watering. This same water thrown or sprinkled over plants infested with bugs, destroys the insects.

e. Ashes and Leached Ashes. — Whether from wood, charcoal or turf, ashes are rightly considered one of the best improvers of the soil, as well in farming, on a large as on a small scale. The large quantity of potash and phosphates which they contain, act powerfully on vegetation, they therefore also have the double character of a fertilizer and an improver of the soil. Sometimes they are considered simply as a manure ; when they are used for plants, deriving no benefit from manure, such as peas for example and a few plants of the flower garden.

The name leached ashes is given to ashes which have been used with water and which, in consequence of the treatment they have received are deprived of a large quantity of potash which they contained. Leached ashes are not as active as fresh ashes and should be used in quantities three or four times greater. Unleached ashes are therefore to be preferred.

B. True Manure. Manure is a substance which supplies to the soil the organic elements, of which it is wanting, that is those elements which enter directly into the composition of plants. We will not here endeavour to show the importance of manure in every form of cultivation. It will suffice to recall what we have already said in the first chapter, that there can be no more gardening than agriculture, without the employment of manure in proper and sufficient quantities to suit the crop. We will now briefly examine the different kinds of manure and their uses in connection with horticulture.

a. Stable Manure.—Stable manure is the name given to horse manure, in distinction from the cattle manure from the cow shed.

Stable manure fills the place of all other manures for

the uses of a garden. It is eminently valuable in the cultivation of bedding plants of all kinds. Its most valuable property, which causes it to be preferred by gardeners to all others is the facility with which fermentation may be instantly started or arrested, by keeping it either dry or moist. If fermentation and heating is desired, it only requires to be heaped together and moistened. If on the contrary it is desired to arrest fermentation already begun, the heap is spread, and the manure allowed to dry in the air.

It must not be understood that horse manure is the only available manure for the garden, as, for many plants, unless it is well decomposed it is too heating and contains too much nitrogen; as the experimental farm experiments will show, a mixture of horse and cow dung gave the best results.

Market gardening, generally successfully carried on in the vicinity of large towns employs great quantities of stable manure.

The remains of the decomposition of stable manure is a black mould, which is of the greatest possible value in the cultivation of almost all garden vegetables.

b. Cow-dung.—The manure from the cow shed so valuable to the farmer, is on the contrary little sought after by the gardener who finds it cold in comparison with stable manure. It is less active than the latter and would not answer for the cultivation of plants requiring strong fertilizers, such as the melon and the strawberry; but it is very suitable for the cultivation of most ordinary vegetables. It may even be said that in calcareous, sandy soil wanting in consistency and liable to excessive heating from the rays of the sun, cow dung is often preferred to stable manure.

c. Manure from the sheepfold.—Is largely similar in its properties to stable manure and if the latter cannot be obtained, mixed with cow dung it is often used as a substitute. A mixture of these two manures, in equal parts may be used advantageously in all garden cultivation.

d. Colombine and guano.—Under the name of colombine is understood the manure produced by the birds of the farm yard and the pigeon house. It is the most active fertilizer known for cultivation in either farm or garden; but precisely on account of this activity it can only be used in

small quantities and mixed with other manures. Colombine dried and pulverized will keep for a very long time without losing its fertilizing properties.

Guano is an imported foreign fertilizer very similar to Colombine, it is brought from South Africa, Peru and Chili. It is the result of the droppings from sea birds, mixed with feathers, the bodies of fish and other animal remains, accumulating for centuries on certain rocks in the Southern seas. It may however, be advantageously replaced by certain chemical fertilizers such as phosphates, superphosphates, nitrates of soda and scoria. The reader will realize the importance of these fertilizers on referring to the tables on pages and giving the results of experiments on potatoes at the experimental farm at Ottawa.

e. Refuse from Cities.—The fertilizer under this name is composed of all substances collected from the streets in the form of mud and dirt. It is a powerful fertilizer, but its rank odour and the bad flavour it is said to communicate to vegetables, should banish it from the garden; its true place is in the working of the farm.

f. Liquid Manures.—The same thing may be said of liquid manures, mostly very rotten, they trickle from the manure heap. They are known as soakage. Of great value to the farmer, the gardener can hardly use them except to assist in the decomposition of plants which he desires to convert into vegetable earth. Still when largely diluted with water and sufficiently decomposed, they may be very advantageously used in the form of spray in the cultivation of the kitchen garden.

g. Vegetable earth is the residue of decomposed manures; it is very rich in mould and will keep for an indefinite time. There can never be too much vegetable earth in a garden, and although many common vegetables can, if necessary, do without it, there are others, melons for example, to which it is indispensable.

h. Poudrette.—A substance manufactured from materials taken from water closets, is also one of the most active fertilizers known; but it has all the disadvantage of the refuse from cities and should in consequence, like it be banished from the garden at least from use in the vegetable garden.

EXPERIMENTS WITH VARIOUS LOTS OF POTATOES

In 1896, potatoes following wheat, were planted on the 14th of May, came up on the 9th of June and were dug on the 10th of October. In each lot there were nine rows of each of the varieties, Early Sunrise, Empire State and Clarke No. 1.

Potatoes following barley, were planted on the 14th of May, came up on the 9th of June and were dug on the 29th of September. Each lot had nine rows of each of the varieties, Variétés Vanier, Lee's Favorite and Northern Spy. The following tables show the returns of all these varieties by lots and the total returns in bush. to the acre :

EXPERIMENTS WITH FERTILIZERS IN HALF LOTS (1/2 OF AN ACRE) OF POTATOES FOLLOWING WHEAT.

No. of the Lot	FERTILIZERS APPLIED EACH YEAR.	WEST HALF OF THE LOTS			
		Produce of 9 rows of Empire State	Produce of 9 rows of Early Sunrise.	Produce of 9 rows of Clarke No. 1.	Total Return by the Acre.
		lb.	lb.	lb.	Bush. lb.
1	Farm manure (horse and cow dung mixed) properly decomposed, 12 tons to the acre in 1893; 15 tons to the acre each year since	106 1/2	251	285	244 10
2	Farm manure (horse and cow dung mixed) fresh, 12 tons to the acre in 1893; 15 tons to the acre each year since	207 1/2 103 1/2	258 103 1/2	280 100	248 30 102 20
3	No manure				
4	Mineral phosphates, not treated, finely pulverized 500 lbs. to the acre	108 1/2	108 1/2	73 1/2	96 50
5	Mineral phosphates, not treated, finely pulverized, 500 lbs. to the acre; nitrate of soda, 200 lbs. to the acre	116 1/2	113 1/2	110 1/2	113 30
6	Farm manure, partly decomposed, in active fermentation, 6 tons to the acre, mineral phosphates, not treated, finely pulverized, 500 lbs. to the acre, the two made into a compost, thoroughly mixed and allowed to heat for several days before spreading	194 1/2	223 1/2	229 1/2	215 50

EXPERIMENTS WITH FERTILIZERS IN HALF LOTS (1:20 OF AN ACRE) OF POTATOES FOLLOWING WHEAT.—Continued.

No. of the lot.	FERTILIZERS APPLIED EACH YEAR.	WEST HALF OF THE LOTS.			
		Produce of Empire State	Produce of Early Sunrise	Produce of Clarke No. 1	Total Return by the Acre.
		lb.	lb.	lb.	Bush. lb.
7	Mineral phosphates, not treated, finely pulverized, 500 lbs. nitrate of soda, 200 lbs, wood ashes not washed, 1000 lbs to the acre	163	178	160%	163 50
8	Mineral phosphates, not treated, finely pulverized, 500 lbs, wood ashes, not washed, 1,500 lbs	194%	127	131	127 30
9	Mineral superphosphates No. 1, 500 lbs to the acre	112	74%	127	104 30
10	Mineral superphosphates No. 1, 350 lbs, nitrate of soda, 200 lbs to the acre	142%	137%	155	145 20
11	Mineral superphosphates No. 1, 350 lbs, nitrate of soda, 200 lbs; wood ashes not washed, 1,500 lbs to the acre	184	222%	223	209 50
12	No manure	120%	86%	89	98 40
13	Fine bone dust, 500 lbs to the acre . .	133%	103	90	108 50
14	Fine bone dust, 500 lbs, wood ashes not washed, 1,500 lbs to the acre . .	162%	153	136	150 30
15	Nitrate of soda, 300 lbs to the acre . .	113%	108%	111%	111 10
16	Muriate of potash, 150 lbs to the acre .	136%	135	114%	128 40
17	Sulfate of ammonia, 300 lbs to the acre	109	84%	82	81 50
18	Sulfate of iron, 60 lbs to the acre . . .	117	105%	92%	105 00
19	Common salt (chlorure of sodium), 300 lbs to the acre	127%	103	72%	101 00
20	Plaster for improving land, gypsum (sulfate of lime), 300 lbs to the acre	152%	98	88	112 50
21	No manure in 1889, Mineral superphosphates No. 2, 500 lbs to the acre, each year since	135%	117%	103%	118 50

By comparing the lots 3 and 12 in each table with the other lots and keeping in view the quantity and the mixing of the fertilizers the important action of the chemical products and manures will readily be seen.

EXPERIMENTS WITH FERTILIZERS IN HALF LOTS (1/20 OF AN ACRE) OF POTATOES FOLLOWING BARLEY.

No. of the Lots	FERTILIZERS APPLIED EACH YEAR.	HART HALF OF THE LOTS.			
		Produce of 9 rows of Vanier.	Produce of 9 rows of Lee's Favorite	Produce of 9 rows of Northern Spy.	Total Return by the Acre.
		lb.	lb.	lb.	Bush. lb.
1	Farm manure, properly decomposed, 15 tons to the acre.....	317	230	320	202
2	Farm manure, fresh, 15 tons to the acre.....	273 1/2	217	293 1/2	201 20
3	No manure.....	134 1/2	95	141	123 30
4	Mineral phosphates, not treated, finely pulverized, 500 lbs to the acre.....	84 1/2	73	154	105 30
5	Mineral phosphates, not treated, finely pulverized, 500 lbs, nitrate of soda, 200 lbs to the acre.....	112 1/2	00 1/2	143 1/2	105 30
6	Farm manure, partially decomposed, and in active fermentation, 6 tons to the acre, mineral phosphates, not treated, finely pulverized, 500 lbs to the acre, the two made into a compost, thoroughly mixed and allowed to heat for several days before spreading.....	235 1/2	142 1/2	266	214 40
7	Mineral phosphates, not treated, finely pulverized, 500 lbs; nitrate of soda, 200 lbs; wood ashes, not washed, 1,000 lbs to the acre.....	179	94	203 1/2	108 50
8	Mineral phosphates, not treated, finely pulverized, 500 lbs; wood ashes not washed, 1,500 lbs to the acre.....	195 1/2	93	202 1/2	165 31
9	Mineral superphosphates No 1, 500 lbs to the acre.....	162	124	183 1/2	156 50
10	Mineral superphosphates No 1, 350 lbs; nitrate of soda, 200 lbs to the acre.....	178 1/2	137	202	172 30
11	Mineral superphosphates No 1, 350 lbs nitrate of soda, 200 lbs, wood ashes not washed, 1,500 lbs to the acre.....	215	130 1/2	198 1/2	181 20
12	No manure.....	121 1/2	59 1/2	105 1/2	95 10
13	Fine bone dust, 500 lbs to the acre.....	122 1/2	71 1/2	154 1/2	116 10
14	Fine bone dust, 500 lbs, wood ashes not washed, 1,500 lbs to the acre.....	232 1/2	122 1/2	233 1/2	196 10
15	Nitrate of soda, 200 lbs to the acre.....	91	72 1/2	134 1/2	101 00

EXPERIMENTS WITH FERTILIZERS IF HALF LOT (1:20 OF AN ACRE) OF POTATOES FOLLOWING BARLEY.—Continued.

No. of the Lots	FERTILIZERS APPLIED EACH YEAR.	EAST HALF OF THE LOTS.			
		Produce of 9 rows of Vanier.	Produce of 9 rows of Lee's Favorite.	Produce of 9 rows of Northern Spy.	Total Return by the acre.
		lb.	lb.	lb.	Bush. lb.
16	Muriate of potash, 150 lbs to the acre	147	79	142½	122 50
17	Sulfate of ammonia, 300 lbs to the acre	98	74	162	111 20
18	Sulfate of iron, 60 lbs to the acre....	150	88½	150½	129 40
19	Common salt (chlorure de sodium), 300 lbs to the acre.....	133½	63	121	105 50
20	Plaster for improving land, gypsum (sulfate of lime), 300 to the acre ..	142½	76½	191½	136 50
21	Mineral superphosphates No. 2, 500 lbs to the acre.....	154½	114½	195	154 40

CHAPTER FOUR

Tilling the soil — Breaking up ground, how to do it — Ploughing — Digging with a spade, with a pick — Depth for the various modes of tillage — Implements for tilling the garden — Spades of various kinds — Picks and hoes of different shapes — Varieties of, their shapes and uses — Weeding hooks, rakes and scrapers — A levelling tool, a cord.

Every piece of ground intended for cultivation, should in the first place, before anything is done, be furnished with suitable tools. There are two ways of beginning the tillage 1. by breaking up the ground and, 2. by ploughing, which, however, are but two ways of performing the same operation.

Breaking up the ground is a deeper tillage than ordinary ploughing. Loosening the soil is not its only object, it also renews it by bringing to the surface the lower bed of arable soil and replacing it by the upper bed. Another result of this work is to allow the air and water from the rains and the watering cart more easily to penetrate the ground and to come into direct communication with the roots of the plants.

Breaking up the ground is not always done in the same way; it varies according to locality — soil and more particular according to the nature of the cultivation which it is intended to follow. At present, we have only to consider the matters in connection with gardening.

The best way to break up the ground is the one which takes in the whole extent of the land which it is intended to convert into a garden. To do this, a trench or ditch, 35 or 40 inches in width and about 15 inches in depth, is opened at one end of the piece of land; the earth taken out of this trench is carried to the other end of the piece of land. This trench is then filled in with earth taken from a parallel trench of the same size, always being careful, as already stated, to place the upper layer of earth at the bottom of the trench and *vice versa*. This process is continued gradually until the end of the piece of land is reached, where will be found the earth taken from the first trench, which will be used to fill up the last one.

Trenching is best done in the Autumn and the land left in ridges in order that it may be improved by the winters frost and when leveled in the spring will be in a condition

to receive the crop much earlier than if it had been lying flat and solid all winter.

Another way of breaking up the ground, less perfect, it is true, but requiring less time and labor, is by digging with a spade in the ordinary way, but being careful to dig to twice the depth of the spade that is to say, that having dug the first trench and turned over the earth at a distance of about 20 inches, a second trench should be dug at the bottom of the first and the earth from this thrown on top of that which was first turned over. This is after all only a double digging, but in many cases this imperfect breaking up of the ground will be found sufficient for the cultivation of vegetables.

Picks and hoes may also be used in breaking up land, but the work done with these tools is not generally as valuable as that which we have just described and which is about the only system followed in countries where horticulture flourishes. Simple tillage is much less laborious than breaking up the ground, but, per contra, has to be repeated more frequently. The system of work and the tools employed are of a great variety. They may, however, be reduced to two leading systems, according as the hoe or the spade is used. Tillage done with the hoe does not separate the earth as thoroughly and is not as good as that done with the spade, but it is more expeditious and economical. The plain hoe is used in dry light soils; the forked hoe is more suitable for damp tenacious ground, but the forked hoe should always be used in tillage among the trees and shrubs in ornamental gardens as this implement will cause less damage than the spade to the roots which run in every direction.

Tillage with the spade is almost the only way allowed in a well kept garden. It is done in the following way: a first trench of double the width of a spade and of indefinite length is opened at the end of the piece of ground to be dug up; the earth from this trench is scattered over the rest of the ground; or better still it is carried to the spot where the digging is to end, to fill up the last trench and so not leave inequalities in the ground; the earth is then taken by spadesful and turned over on the other side of the trench, dividing and crumbling it with the spade, so that the bottom and the top may be equally divided, the surface without inequalities

and the trench everywhere of an equal width and depth. At the time of turning over the ground, care must be taken to remove all stones and large roots which may be found. If the land is covered with weeds, they should be buried in the bottom of the trenches, except couch grass, mint and field thistles, which must be gathered up and removed as otherwise they would soon reappear on the surface of the ground.

If manure is to be dug in, it should not be placed at the very bottom of the trenches, the depth of which will sometimes be too great to allow the roots of the plants to reach it; it should be spread on and the earth thrown over it so that it will be little more than 2 or 3 inches from the surface.

When sloping land has to be dug, care should be taken not to commence the work at the bottom of the slope, because doing so would have the effect of accumulating the earth on that side to which it already has too great a tendency, and to strip the earth from the higher part. As far as possible the first trench should be dug at the top of the slope, by this means a certain quantity of the earth, as much as the size of the trench, will be carried upward. On a very steep slope work carried on in this way might be difficult,—in such case the work should be commenced on the side that is across the slope, so that the soil would at least not slide downwards.

The depth of the digging depends upon the nature of the ground and the kind of plant it is intended to grow. In light and shallow ground, a digging of from 6 to 7 inches is sufficient, in strong and deep ground it should be worked to 10 or 12 inches; this ground is best for the growing of shrubs and plants with tap-roots which run straight down. The shallow soil should be reserved for plants with short fibrous roots, running near the surface.

Besides the digging of which we have just spoken and which is generally done before sowing or planting, there are others which are very superficial, on ground already under cultivation, and are done for the purpose of breaking up the crust which forms on the top of the ground from the effect of watering and to destroy the weeds which sprout naturally on cultivated land.

The above operations are designated by the words digging, hoeing and weeding. These operations are performed with various light implements or tools, which are in reality

only small hoes, spades and forks and of which we will now give the description.

Implements used in gardening.—As stated above, the spade is the implement most generally used in turning up the soil of the garden ; it is a sort of shovel with a wooden handle of a fixed length. Spades are made in different sizes, according to the nature of the ground and the work to be done. (Fig. 1).



Fig. 1.—Spade.



Fig. 2.—Forked Spade.

Hoes also called mattocks differ from spades in that the handle instead of being more or less parallel to the centre of the iron, forms with the latter a more or less open angle, but almost always less than a right angle and that it brings the earth towards the feet of the persons using it, instead of pushing it before him as is done when the various kinds of spades are employed. Hoes are made in different shapes

according to the kind of work to be done. The length of the handle also varies in accord with the shape of the iron and its curvature.

The mattock gives great power to the laborer in raising large clods of earth, but it compels work in a stooping posture, a most fatiguing position to which every one cannot become accustomed. Hoes are made of iron full, square or sharp or in prongs according as required.

Small hoes, forked hoes and weeding hooks (figs. 3, 4, 5 and 6) are small tools, intended for the double purpose of disturbing the surface of cultivated ground and digging out the weeds. All these tools are but modifications of the hoe and spade with a diminution of size which renders them easier to handle, but they must be light and well made. The true weeding hook is a small tool in the use of which the gardener must bend low or work on one knee.



Fig. 3 Small Hoe.



Fig. 4—Ordinary Forked Hoe.

The only difference between it and the common hoe is in the shortness of its handle and the addition of a third prong or tooth, a form which makes it very handy for the tearing up of weeds and running roots, which are otherwise difficult to destroy.

The rake is the harrow of the garden, it is used for leveling ground which has been dug up and in breaking up the superlying clods, in removing stones and roots and in covering over the seed; rakes are also used for finishing the work of the scraper in the garden walks. They should be of different sizes, some with fine teeth for the beds and borders, and others larger and heavier for other work. Scrapers (fig. 7 and 8) are used for removing the various weeds which sprout

in the walks of the garden. In flower gardens and other gardens of small size hand scrapers are generally used by the gardener, who pushes it from him and draws it towards him according as it has the shape shown in figure 8 or in figure 9. They are, but modifications of the spade and pick, tools



Fig. 5—Ordinary Weeding Hook

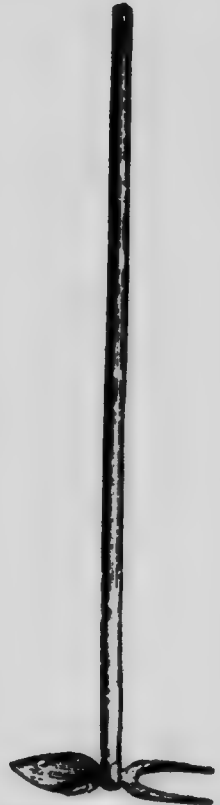


Fig. 6—Forked Hoe and Weeding Hook

which may be used instead of them in many cases. In parks and large gardens, work with these various tools would be too slow, therefore they are generally replaced by the plough or scraper.

Up to the present we have only referred to the tools or garden implements most frequently employed in the preparation of the ground. Actual work and practice will com-

plete the little we have said. To conclude this chapter, we have only to mention the cord which serves to direct the workman in laying out the borders, paths, furrows or ridges for the reception of the seed or plants.



Fig. 7
Raked Spade.



Fig. 8
Raked Hoe.



Fig. 9—Belgian Weeder



Fig. 10
Weeder Trowel.

CHAPTER FIVE

Implements for the carriage of solids : barrows — Implements for the carriage of water : buckets, pumps — Watering, by submersion, irrigation or by hand — Vessels used for watering, their forms and uses — Proper time for watering — Effect of water on vegetation — The different kinds of water considered in relation to the watering of plants : spring water, well water, running water and stagnant water, their qualities and defects, conditions as to quantity and time of watering.

After having viewed, in the preceding chapter, the tools used in the preparation of the ground, it remains now, to complete the study of horticultural implements, to point out the principal instruments employed in the transport of earth, dung and other solid substances, and also of water : two groups which we will examine separately.

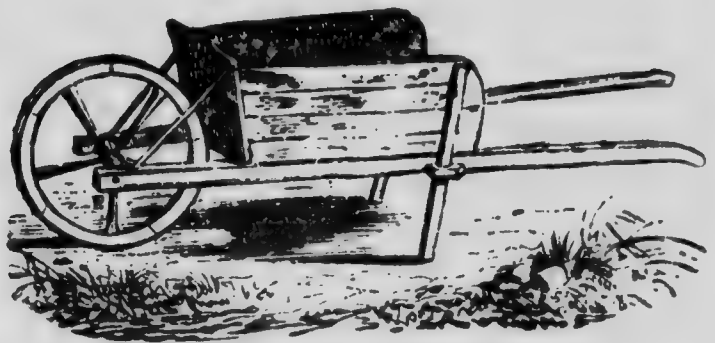


Fig. 11—Ordinary Box Wheelbarrow.

A.— VEHICLES INTENDED FOR THE TRANSPORT OF SOLIDS.

These vehicles are wheelbarrows and hand barrows.

Wheelbarrows are small vehicles with sides, known the world over, cuts of which are given in Fig. 11 and 12. They roll on a single wheel and are supported upon two legs. There is a difference between the box wheelbarrow (Fig. 11) which is generally used in gardening and the skeleton wheelbarrow (Fig. 12) which has no box and which is used for the transport of bulky cumbrous objects which could not

be contained in the box of an ordinary wheelbarrow. Both of them are worked by either pushing or pulling. The skeleton wheelbarrow (Fig 12) is very light and specially intended for the transport of straw, manure, branches and other bulky and cumbrous objects: the back is much higher than that of the ordinary wheelbarrow, which permits the putting on of a much larger load.



Fig. 12—Skeleton Wheelbarrow.

B.—VEHICLES FOR THE TRANSPORT OF WATER.

The vehicles and appliances required in the use of water in the garden comprise not alone the vessels necessary for watering; but also the reservoirs and machinery necessary for the drawing, raising and carrying the water. The most advantageous system exists, where the garden is in the vicinity of a stream, or better still, when it is traversed by a stream which does not run dry at any season of the year, the water from which may be conducted by a system of ditches and pipes, to all parts of the garden, but this is a condition which rarely exists. In many cases rain water, collected in barrels, basins and cisterns, the sides of which are made as watertight as possible, may be made to take its place.

Where the rain water is not in sufficient quantity to supply the cistern and it rarely is, recourse must be had to one or several wells. The head of the underground flow of water may happen to be only two or three yards below the surface, where this occurs a real cistern may be dug which

will always keep itself full. With a greater depth, it will be found advantageous and often necessary to have recourse to the appliances generally used for lifting water.

Buckets, known to every body, will hardly answer, except in very small gardens and wherethe water is at a very slight depth. These buckets are raised either by means of a crank, the axle of which is similar to that of a winch and round which the cord with the bucket attached, winds itself, or by a pulley with one or two buckets, the latter is the best, since the empty bucket going down, lightens the weight of the bucket full of water which is coming up.

Pumps are much more frequently employed, working them is much less fatiguing than raising the water in buckets, and besides, in a given time, they give a much larger supply of water ; but on the other hand their establishment is more expensive and when they get out of order they require the hand of the maker for repairs.

When the water has been brought to the surface of the ground, there is nothing more to do than to use it and it is this latter portion of the work which constitutes the process called watering.

In a manner suitable to the premises and in accordance with the greater or smaller supply of water or of the want of the growing plants, the watering is carried on in various ways, by submersion or by irrigation. Watering by submersion is done by covering the whole surface of the ground with water. It will be readily understood that so considerable a quantity of water, as required for such a process, cannot be brought to the place by either man or horse power ; it is conducted in ditches, made as watertight as possible and which commence at the very point where the water is raised by the machinery. Besides this watering by submersion is very rarely carried on in gardening.

The same remarks do not apply to watering by irrigation which is very general in Southern countries. The water, having reached the ground to be watered, is distributed in the ditches which run between the plants, either in straight or sinuous lines. In this way, the plants themselves are not wet : the water penetrates to their roots by infiltration. This system of watering also requires such quantities of water as it would be impossible to distribute to the plants, if the sprinklers in general use were employed.

Watering by hand, which is really a watering by submersion, is done by distributing water regularly to the plants by means of vessels specially made for the purpose which are called watering pots. By this method much water is saved, but it is a heavy addition to the labor of the gardener, whose time is taken up during the hottest days in summer in carrying water to his plants.

The labor is lightened by placing, at different points in the garden, puncheons open at the upper end and sunk in the ground almost to the head, and into which the water flows through pipes laid for the purpose. From these puncheons, placed at equal distances apart, the gardener draws the water which he sprinkles upon the plants in the immediate neighborhood.

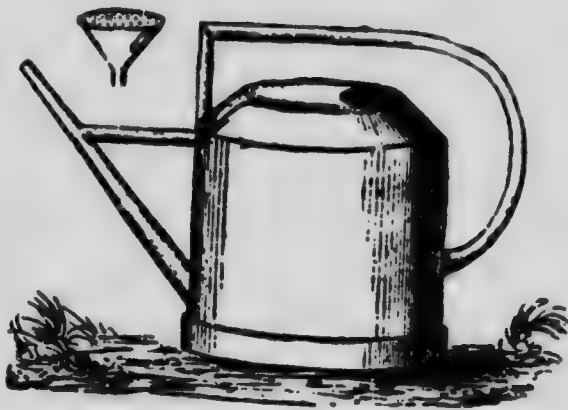


Fig. 13—Watering Pot with Handle.

Apart from the advantage of shortening and lessening the labor, the use of these puncheons has the further advantage of giving the well water time to become aired, and of the same temperature as the ground ; this system also enables the gardener to administer to his plantations in liquid form many fertilizers which can be diluted in varying proportions in these reserves of water.

The watering pots are made of copper, tin or zinc. They also vary in size and shape ; most of them are made round, but some are made flat on the sides which renders them more

handy for carrying about. As to the size, each one selects a size according to his strength. An essential part of every watering pot is an inclined spout, through which the water may escape, at the end of which is fitted at will, a bulb pierced with small holes to separate the water and to spread it in the shape of rain over a large surface at a time. This bulb is called the rose of the watering pot. An improvement not to be despised in the make of a watering pot, consist in a sheet of metal pierced with small holes and placed at the entrance to the spout whose object is to prevent the passage of foreign substances, which being drawn into the rose and blocking the holes, would prevent the proper dispersion of the water.

The watering pots with handles (fig. 13) the use of which is becoming more and more general is distinguished by the peculiar handle with which it is fitted. The handle is so placed that the gardener can manipulate his watering pot with one hand, raise or lower the spout without putting it down ; these watering pots are flattened on the sides.

Watering.—All hours of the day are not equally suitable for watering. In the spring when hoar frost is to be feared, the morning is the time to be preferred, so that the ground may sweat during the day ; in the summer on the contrary the evening is the time to be chosen, as the water will not evaporate so rapidly during the night and the plants will derive more benefit from the watering.

Effects of water in the process of vegetation. As mentioned above. Water is indispensable in all kinds of cultivation. In the working of a farm we are generally obliged to be satisfied with the water from the sky and often the annual rainfall is sufficient to ensure success in cultivation ; but such is not the case in the working of a vegetable garden where of all necessity water must be introduced by artificial means.

There are two reasons why water is indispensable to vegetation : the first is that water itself is one of the principal elements which enter into the composition of plants : the second that it acts as the vehicle to convey to their tissues the other materials which go to their nourishment and which are all more or less soluble in this liquid.

The waters which are available for watering and irrigation are of different kinds and characterized by particular properties the most important of which we will here describe.

Rain water is the best of all for watering purposes, owing to the fertilizing principles with which it becomes saturated in the atmosphere; it is light and well aerated, will dissolve soap and is excellent for cooking vegetables; it should therefore be always carefully collected by placing gutters around the buildings to collect that which falls upon the roofs and to lead it to reservoirs from which it will be drawn later on as it may be required for the garden. Similar advice may be given with reference to water which falls in elevated or stony places and which not being immediately absorbed by the ground, runs away in the form of rivulets; great advantage will be derived by bringing them together at some point in the garden or on the estate, situate in such a way that later on the water may be made to circulate wherever the necessity for it is felt.

Spring Water.—Too cold for immediate use in watering, these waters almost always contain in solution mineralogical principles borrowed from the land through which it has passed, of which some are favorable, others hurtful to vegetation. They should therefore only be used with discretion, until experience has taught the effect they will produce upon the growth of vegetables.

Well Water.—Generally possesses the same properties as the water from springs of which it increases the defects. It is therefore the worst water of them all and unfortunately the most used. Over charged with mineral principles, particularly with carbonates and lime sulfates, it scarcely dissolves soap and is bad for cooking vegetables. It may still however be used for watering and many gardeners have no other; but they are careful before using it, to give it a long exposure to the air, so as to enable it to precipitate the lime which it contains in excess, to absorb the atmospheric elements and to attain a temperature more suitable for watering purposes. This amelioration of well water is often considerable quickened by beating it up and stirring it for some time.

Running water is that of rivers, brooks and streams. It is nothing but the mixture of the waters of thousands of

springs in one common bed. These waters are as a general rule more profitable to vegetation in proportion to the distance by which they are removed from the points at which they have emerged from the ground; they contain more air, are warmer and the mineral principles which they contain are better disguised by the mixture of waters unequally charged or charged with different principles. Stagnant waters are those which have neither current nor any visible movement, such as the waters of ponds and marshes. Exposed to the sun and to atmospheric agencies of all kinds, they become filled with animalcula and vegetation, which by decomposition, pollute the water, but at the same time charge it with certain qualities of the greatest value in the watering of plants.

The quantity of water to be given in a watering cannot be fixed by any general rule. The climate, the nature of the soil, the state of the season and the constitution of the plants must be taken into consideration, the same may be said as to the proper time to do the watering; the gardener himself must be the judge. Practice and observation will teach him more in this respect than all the advice he may be able to secure from books. Good judgment should be exercised in the artificial application of water. Even in very dry seasons it is often better to wait for rain than to apply water in any considerable quantities.

CHAPTER SIX

The plan of the vegetable garden.— Division into squares, beds and borders — The main walks, small walks, and pathways — Positions of fruit trees and ornamental plants — Width of the beds, and borders — Sloping beds — Hot-beds, their formation and uses — Half warm beds, deep beds — Glass frames — Mats, straw or other coverings.

Before entering upon the detail of the proper cultivation of a garden, we must conclude the general ideas commenced in the preceding chapters, by pointing out the correct manner of laying out the ground intended for a garden, and the division of its different parts with reference to the plants it is intended to cultivate.

The laying out of the ground varies with the kind of garden desired, whether a vegetable garden, an orchard or a

flower garden; but it also depends upon the exposure, the shape and the extent of the lot of land. Its distance or proximity to fences and buildings, the nearness of water, &c. With regard to this no general rule can be laid down. Practice alone, together with an attentive study of gardens already in existence, will teach what is necessary to be done under certain given circumstances.

However, whatever the conditions may be, there are certain rules which are applicable to all: Such as the division of the ground into squares, beds and plots, separated by walks or simple paths, as it is of the first necessity that there should be free access to all parts of the garden between the various plantations, with the tools and implements necessary, either for ordinary work or for watering, or lastly for the gathering in of the crop.

The most simple case is where the land, intended for a garden, is as near as possible in the form of a level square, or at least with only a slight slope and of not too large an extent, half an acre or thereabout. Convenience alone will point out that one principal or main walk should divide the garden length-ways, commencing at the side in which is the gate, the latter being as near as possible to the end of the walk. But with a larger extent of ground one walk alone will not be sufficient; one two or more, running parallel to one another, cut at right angles by other walks, will be required, so as to divide the ground into squares. These squares will themselves be subdivided into separate beds, or cultivated as they are, according to the kinds of plants to be put in.

But as previously stated a vegetable garden generally contains a certain number of fruit trees and even of ornamental plants and flowers. This being the case, particular arrangements, which we will here point out, must be made for the laying out of the ground for a vegetable garden, at once the most indispensable and general in connection with the farmer's household.

All the large walks, or in fact, all the walks, which are not mere pathways, should have a wide parallel border on each side, with either shrubs, or flowers. These borders are separated from the neighbouring squares by a path which gives free passage around it and isolates the borders from

the beds into which the square may be divided, which beds generally run in a direction perpendicular to the border. In the principal walk, that running directly from the gate, or more immediately facing the dwellings, ornamental plants may be put in among the more useful which are set in the borders. These are generally shrubs or flowering plants, those of strong growth and easy culture should be chosen and of sufficient size to be seen from a considerable distance away.

When the plan for the laying out of the garden has been decided on, there will be no difficulty in tracing the walks, the beds, the borders and the paths which separate the latter. All these works can be done with the cord and scraper, which very little practice will enable anyone to handle with ease. The proportions to be given to these different divisions are variable, but as a general rule and except under particular circumstances, measurements may be fixed, from which only slight deviations will be found necessary; 1 yard and 20 inches is a sufficient width for the principal walk in a vegetable garden, 1 yard for the other walks, while 25 inches, or even less is wide enough for the paths which separate the beds from one another. The beds themselves should rarely exceed 1 yard and a half in width, that is double the distance, that a man on his knees alongside of the bed, is able to reach with his hand. The object of having the beds this size, is to facilitate the different work to be done, such as weeding, hoeing, watering and the gathering of the crops, without being obliged to walk or stand on the bed itself. So far as the length of the beds is concerned there is no limit, except the length of the squares of which they form part and sometimes that of the whole garden itself.

These are the preparatory works which apply to gardens in general; but garden works are not always limited to the above, there are others, especially in connection with kitchen gardening, which are characterized by the advanced system of cultivation which is followed at the present day. This consists in hastening vegetation for the production of early vegetables, in permitting the cultivation of plants belonging to a warmer climate than ours and which otherwise could not be successfully produced in this country. The following is a brief description of the methods for the attainment of these results.

There is nothing particular to remark about the exposure of the beds and borders above referred to, they are on the same level as the rest of the garden and follow all its inclines, when it is not a perfect level. But this arrangement is far from being the best in our rigorous climate to enable us to draw from the soil of the garden all the benefits it can produce and a remarkable advantage is obtained, when it is possible to give them such an exposure and incline as will enable them to receive the greatest amount of heat from the sun. It was the gardener's knowledge of the effect of a certain slope or incline towards the south, which suggested the sloping and shelving bed, now so generally adopted in kitchen gardens.

A sloping bed is a border of greater or less extent, sheltered by a fence or a curtain of small trees or shrubs, either from the north or other prevalent winds of the locality. It should incline slightly to the south. Vegetables sown or planted in a bed of this kind are always several days in advance of those growing in the open field.

Ados or Shelving Beds.—The perfectly level condition of the garden square is corrected by the formation of these shelving beds. These shelving beds or borders should as much as possible extend lengthways from east to west and should incline on their width in such a way that the northern side should be higher than the opposite one. After the ploughing, a line is stretched at the top of the shelving beds so as to dig its line with a spade which cuts the sides square and renders the earth more solid by flattening on the north side, which thus becomes almost a vertical slope. The earth which has been cut off is thrown on to the bed.

Beds. But a better way of hastening vegetation is by the use of beds—and their accessories, such as glass frames or sashes. They are to-day in such general use in kitchen gardens and particularly in vegetable gardens, that if one wished to give them up, it would be necessary at the same time to abandon the cultivation of a large half of all the vegetables and other food plants which are the basis of this portion of horticulture.

A bed, considered in a general way, is a heap of dung, leaves, mosses and other substances capable of fermentation, made into a sort of bed which is covered with mould, the

length and thickness whereof varies with the seasons and the variety of plant which it is desired to cultivate. Sometimes, although not often these beds are put down into square or rectangular ditches and are thus but slightly raised above the level of the ground. Gardeners are in the habit of making these beds in many different ways, but they may be all reduced to the following three classes.

THE HOT BED.—To secure a crop of early salads and to grow a supply of cabbage, cauliflower, tomato and other plants for transplanting to the open ground ; a hot bed and cold frames, according to the size of the garden, will be required unless the amateur prefers to purchase such from those who make it their business to raise them for sale, but home grown plants are preferable because they can be planted direct from the hot bed or cold frame without the fine fibres being damaged by exposure, packing or travel, and when most convenient to the owner. Early vegetables are always valued, the early spring months are almost always cold and not suitable for germination but by means of the artificially obtained heat and moisture of the hot bed or even a cold frame covered with glass, this difficulty can be overcome, and the crop much advanced by raising seedlings or plants from cuttings in it, and transplanting them into the open ground as the season progresses. It requires however some skill and knowledge to insure success in the making of a hot bed, because, if not properly made the heat may come too suddenly and violently and expend itself just as quickly, and at the time when it is not needed.

March is usually the month to begin the preparations for making the hot-bed, but if the weather continues to be very severe it is advisable to wait until it has moderated in some degree before commencing.

In making the hot-bed use stable manure mixed with fallen leaves of the previous autumn, in the proportion of $\frac{2}{3}$ manure to $\frac{1}{3}$ leaves. To make sure of a steady, moderate and continuous heat, the manure and leaves, well mixed, should be thrown into a heap and turned over every few days until uniform fermentation is secured before it is built into the hot-bed. If this is not done the heating will be irregular, different in different parts of the bed, and either too sluggish or too active, and will also be of short duration.

Make the hot-bed about $1\frac{1}{2}$ feet larger each way than the frame, shaking and spreading regularly each forkful of manure, treading it down uniformly so that it may be equally solid and moist in every part. The bed; if made three feet deep, will settle down to 2 feet, and this will be enough for all practical purposes. Put on the frame and sashes as soon as the bed is finished, and bank round the bed and frame with some fresh manure. Open the sash a little for a few days to allow the first strong heat to pass away.

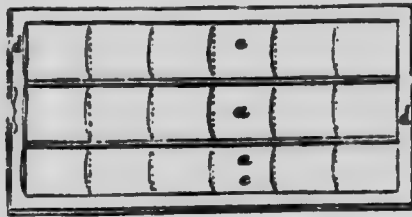


Fig 14—Glazed Frames

Now throw into the frame, (Fig. 14—Glazed frame) and level some good light composted soil, and when the temperature is at 90° , the bed will be ready for use, and seeds, sown in boxes or pans, may be placed in it. And now the most careful watching will be necessary if failure is to be avoided. First, as to temperature, this must be regulated by judicious admission of air, covering at night and shading during the prevalence of strong sunshine; the young plants must be gradually hardened off by admitting more air before removing them to the cold frame. Watering the hot-bed properly is one of the chief essentials to success. Cold, hard spring water is not so good as soft rain water, but if the former must be used it should always be allowed to stand for a few days to become softened by exposure to the air and light; before it is used it should be about the same temperature as the atmosphere in the frame; evening is the best time of the day for watering, a good, liberal allowance of water on e a day is better than a frequent occasional sprinkling of the surface; after the watering the frame should be closed for the night, and if cold, covered until early morning. If the hot-bed cool too much while the crop is in it the heat may be revived by lining the outside of it with some more partially fermented manure; it will be well therefore to have

a reserve of mixed manure and leaves on hand more than will be required for the hot-bed, and if it becomes requisite to add a lining, this can be forked over a few times until it heats, and then it can be used for the purpose. To line a hot-bed, cut down with a sharp spade, the manure, all round level with the frame, remove the spent manure and make some holes in the bed with either a crowbar or a sharp pointed stake, then build the lining, two feet wide all around it, in the same manner as the hot-bed was made: by this means the heat will be renewed, and the bed continued in use much longer.

Beds Semi-Heated. What has just been said about the construction of hotbeds. applies equally to that of semi-heated beds. The proportions and the work are the same. The whole difference consists in the kind of dung used. While in the making of hotbeds, nothing but horse dung unmixed with anything except leaves, can be used, the semi-heated beds are composed of horse dung, cow dung and sheep dung in equal proportions, which, even when all united together, form little more than the third or at most the half of the bed, the rest is made up of leaves of trees, either dry, or collected in the autumn under the trees and preserved in heaps more or less decomposed.

It often happens that an intense heat develops in these kind of beds during the first days, this arises from the fact that the dung at the time of using was either too moist or too rich in animal matter. This would be a dangerous time to put in seed, which should only be done after the bed has, so to speak spent its heat. A very moderate degree of heat is sufficient, which besides is kept up for a long time by the slow decomposition of the leaves. It must be remembered that the semi-heated beds are made at a season of the year when the sun has attained a certain power and when, in consequence the heat of the surrounding air is a powerful assistant to vegetation.

Deep Beds.—In comparison with the first described, these beds give but a very slight degree of heat, very little greater than that of the earth itself, but on the other hand, it lasts for a long time. They are always made in a trench from 12 to 15 inches in depth. The manure used is only of half strength. It is generally a manure which has been

used in making hot-beds or semi heated beds and which is no longer of any use in furnishing the heat required for these two kinds of beds. When they are covered over with earth, they are only a few inches higher than the level of the ground.

Deep beds are not furnished with either boxes or glazed frames ; their principal purpose is to complete in the open air the cultivation of melons commenced in hot-beds or in semi heated beds ; but they are also often employed in the cultivation of many other pot-herbs, of which it is desired to hasten the growth and cause the crop to last until the first frosts. In the latter case if the season is advanced and the nights already cold, the plants should be covered at night with straw or canvas, which should be removed in the morning.

CHAPTER SEVEN

General principles of cultivation — The increase of vegetables by natural and artificial means — Reproduction from seed ; its preservation ; the time will keep. — Various ways of sowing — Reproduction by means of shoots, bulbs, tubers — buds, &c — Various ways of artificial reproduction ; layers and slips.

After having successfully reviewed the various elements which go to the making of a garden, examined the effect of the nature of the soil, the air, the water, fertilizers, heat and other physical agencies, pointed out the principal implements of garden culture and their uses, we will now take up the detail of cultivation itself from a general point of view.

The first question which we will consider is that of the increase of vegetables, either by natural methods, or by those which science has pointed out, methods which are of equal importance from a practical point of view. Plants reproduce and increase naturally by their seeds, or by other parts of themselves such as roots, bulbs, tubers, shoots, &c. ; they are artificially reproduced by layers, slips and grafts—We will examine separately these two principal means of reproduction, but only as far as concerns the subject of this work.

§ 1.—NATURAL REPRODUCTION

A.—FROM SEED.—The production from seeds and their dissemination is the most general way in which nature effects the reproduction of plants. In most cases the gardener adapts the same methods to attain the same results and sometimes to obtain new varieties.

In gardening it is of the greatest importance that none but the very best seed should be employed; therefore in well conducted gardens, care is always taken to reserve for the production of seed, the most healthy and vigorous plants or those uniting in the highest degree the qualities it is desired to perpetuate. As a rule seed should only be collected after it has attained its full maturity, that is to say when it is about to drop from the parent plant.

After having been gathered, seed should be kept dry, especially when it must be kept many months before being sown. It is liable to rot or to deterioration in many other ways, if exposed to moisture, in which case it is no longer in a condition to vegetate. Certain seeds preserve their germinating properties for a great number of years, beans for example, but there are not many of this kind. Others on the contrary lose this property at the end of one or two years.

The trade in seed has lately become so extensive, that it is often better to purchase it from the stores, not alone because it is not always possible to raise seed plants, but also because in many cases it is an advantage to sow seed which has been grown in a country other than our own. In such a case, care must be taken, as far as possible, to make sure that such seed has not lost its germinating faculty, that it is not rotten and was not harvested before arriving at maturity, a fact which is not always easily discovered, even after opening the seed for an examination of the germ. A good plan to distinguish good full seed from that which is empty or incompletely formed is to put it into water; bad seeds will generally float, while the good will sink to the bottom on account of their specific gravity which is generally greater than water.

The manner of sowing seed varies in accordance with its kind, its shape and its size. A large number of seeds

require no preparation and may be put into the ground in the condition which nature has given them ; others on the contrary, those, for example, which are tufted, hairy or rough, when sown broad cast or in furrows stick to each other and an uneven sowing is the result. To avoid this, they must be rubbed in the hand with fine sand or ashes to smooth down the tufts and hairs. Very small seed should be mixed with dry well sifted earth, to secure an even distribution over the ground.

Some seeds the stones of fruit trees for instance take a considerable time, a year or more, to sprout. To save time they are (*stratified*) laid in layers while waiting the time of planting, that is to say, they are placed in vessels in layers, separated from one another, with alternate beds of earth or sand from 1 to 2 inches in thickness ; they are then buried in the cellar about 1 foot below the surface. They pass the winter in that position and the work of sprouting generally commences during that time. To hasten it, they may receive a slight watering about the end of April, if the weather is mild ; they are taken up and planted in the course of the month of May.

In putting in seed, there are two general principle which must not to be lost sight of, firstly, fine seed should be proportionately lightly covered with soil, and secondly the more the soil is shaken up, the better the growing of the roots. Few kinds of seeds show exception to these two rules. Very small seed should be simply scattered over the ground and a few lines of mould shaken over them, rather to shelter them from the light than to effectually cover them up, as broken moss is used with equal advantage. For larger seed, although still fine, a covering of one inch of earth should be used. The essential part is that the seeds must be protected from the action of the light, which is adverse to germination, and that the earth must contain a certain amount of moisture, as seed would not develope in soil which was perfectly dry. It is often necessary after sowing, to beat down the earth, either by the use of a roller or by striking with a spade, an operation the effect of which is not to harden the ground but rather to bring the seed into more immediate contact with it, doing away with the spaces formed by the ploughing or digging. Finally when there is reason to fear that the ground

may harden on the surface and choke the young plants, even before they have come up at all, which happens, often enough, when the soil contains too much clay or is too much exposed to the direct rays of the sun, the seed-bed should be covered with light straw taken from old hot beds, or with broken up moss, or simply with a slight sprinkling of mould of a few lines in thickness over the land.

The depth at which seeds should be planted is a consideration which claims the attention of the cultivator, and it may be given as a general rule that large seeds, and especially those which have the germ covered with a hard shell or skin, should be planted deep, and very small ones with thin delicate covering, near the surface, and merely pressed in gently. If seeds are planted too deep they have moisture without heat, air or oxygen, and if too near the surface they are too dry and warm, but lack the moisture. Seeds also germinate more freely in the dark, therefore they should be covered with sufficient earth to exclude the light, but not enough to prevent the action of the atmosphere. As above stated, vegetable seeds should be covered according to their size and degree of hardness. The following examples may serve as a guide:—Turnips and cabbages, half an inch; onions and carrots, one inch; spinach and beets, two inches; peas, three; and beans, four inches. The later seeds are sown in the spring or early summer, the deeper they may be covered. Some very small or soft skinned seed may be sown on the surface (the ground having first been moderately sprinkled with water to make it quite flat) and then covered very slightly with some finely powdered earth and pressed in gently.

As to the manner of effecting the sowing it must be done in relation to the kind of seed and consequently of the plant to be produced. The following are the principal methods.

Sowing Broadcast.—The seed is scattered by hand, the sower throwing it before him for a certain distance as evenly as possible. The sowing should be light when the plants require a considerable space to develop and even then it is often necessary to thin them later on by hand. This style of sowing requires a great deal of practice to secure an even distribution of the seed.

Sowing in Furrows.—This kind of sowing is more particularly adapted to plants which require hoeing and earthing up. To carry it out straight furrows of one or two inches in depth are opened, the seed is placed in them, and then covered up by throwing back the earth on top. Broadcast sowing is more suitable to field crops such as grass and grain, but garden crops are better sown in drills or rows on account of weeding and thinning.

Sowing in Hills.—This consists in placing the seed in holes dug in the ground at such distances and depths as will suit the nature of the plant. Properly speaking this is only a modification of the preceding method.

Sowing in earthen Pans and Pots.—This method of sowing is carried on, in connection with ornamental horticulture, for delicate plants, whose exposure must be changed and which must be brought into the house, or into a green house for the winter. Species of plants, to which transplanting is dangerous, or which can hardly be transplanted without the clod of earth about their roots, are generally put into isolated pots. This kind of sowing requires so many attentions, not properly connected with our subject, that we can not enlarge upon it at present.

Sowing in Beds.—This method of sowing is also done, either broadcast or in pockets; it is specially applied to plants, the sprouting of which it is desired to hasten by artificial heat, or which, owing to their delicacy of nature, cannot be grown in the open field. Glass greatly hastens the germination and development of plants sown in beds; there are some even for which the hotbed is an absolute necessity.

B. BULBS, ROOTS, TUBERS, LAYERS, SLIPS, &c.—Independently of growing from seed, there are many plants which reproduce naturally from other portions of themselves which at certain season become detached from them. Gardening has taken advantage of this provision, which is generally more expeditious than sowing; but these varied methods of propagation confine themselves to the reproduction of the varieties as they exist, without creating new ones. The following are some of them.

Bulbs, roots, shoots, buds, &c.—All these different denominations are simple modifications of the same thing,

the bud. Bulbs and roots are underground buds, which after a certain time develop into new plants similar to those, from which they were produced such are the lily, the tulip, the crocus and garlic. Buds themselves are only bulbs of smaller size. The small bulblets which grow at the axils of the leaves of certain plants or at the top of the stem in the place of flowers, are only buds under another form. All these different bodies are employed in reproducing the species from which they have originated. They should only be collected when they have dropped naturally or when the leaves and stems of the parent plant have become dried up. Most of them may be preserved in a dry place from one season to another and be planted as true seeds.

Tubers.—In a certain number of plants the roots, or often the underground branches, have the property of swelling and of absorbing the sap which goes to the nourishment of the new stems. The potatoe and Jerusalem artichoke are well known examples. These tubers are taken up when they have attained their full maturity which takes place after the decay of the parent plant. They can generally be preserved from one year to another. They are planted in the Spring, either whole, or cut up into pieces. They must be furnished with eyes or buds to enable them to reproduce; these eyes or buds are the germs from which the stems grow out. Portions of tubers, without eyes would simply rot in the ground without producing anything.

Offsets, Suckers.—These are a kind of shoot which start from the root or the neck of the plant, and which if allowed to run their course would develop into new plants. They are taken off in slips from the parent stem and planted separately. This method offers a rapid reproduction and is much practiced in gardening, wherever the nature of the plant permits, as for example in the growing of artichokes, asparagus and many other species. The runners of the strawberry plant which take root of themselves around the parent stem are of this group, and are called *Stolons*.

§ 2.—ARTIFICIAL REPRODUCTION

Apart from that by the sowing of seeds, the various methods of reproduction above referred to, naturally lead us

to speak of the artificial methods which are in reality only an extension of the former. They are three in number, by shoots, by cuttings and by grafts :

A. Shoots are the portions of plants, which have already taken root and which are separated from the parent stem, to be planted apart and to make so many separate growths. Off-sets and sprigs mentioned above are in reality shoots which take root naturally. But all plants have not the property of giving off shoots from their roots, there are on the contrary large numbers the shoots and branches of which only take root through the skill of the gardener. The raising of plants from shoots is done by many different methods, because different plants take root in different ways. We will here point out the methods in most general use.

a. Simple Shoots (Layering).—A branch is selected, which is near enough to the ground to prevent its being broken when bent for insertion in the ground. The end being bent down is inserted in a furrow about 3 inches in depth at the bottom of which it is fastened down, after which it is covered by the earth used in filling the furrow. The end of the shoot which is kept above the ground, continues to sprout, while the middle portion embedded in moist earth very soon throws out roots. When these roots have thoroughly taken, the shoot is separated from the parent stem, but it is very often advisable not to make the separation too rapidly,—as by one immediate operation, it is better that it should be done gradually so that the shoot may do without the nourishment from the parent plant.

b. Shoots Produced by Compression.—This operation is similar to the preceding one, with this difference, however, that, by this system, to assist the throwing out of roots the shoot is tightly bound round with an iron or copper wire or with a strong cord at the point at which it is desired the roots should form. This binding has the effect of stopping the descending sap and of causing the formation of an excrescence or collection of sappy substances from which roots are readily thrown out.

CHAPTER EIGHT

Natural cultivation, early cultivation, and forced cultivation ; definition, character ; connection between the two — Operations in natural cultivation ; sowing and setting out — Permanent planting — Top dressing with mould and straw ; simultaneous crops — Weeding, earthing up, protection — Rotation of crops, reasons for it — Production of seed — Cultivation of seed bearing plants — Care to be taken to prevent the degeneracy of the different varieties — Collection and preservation of seed, time it will keep.

Independently of the various systems of cultivation which are peculiar to each particular vegetable, gardening may be said in a general way to comprise three distinct systems, known as natural cultivation, early cultivation, and forced cultivation, to be followed according to the season in which it is proposed to harvest the crop.

Natural Cultivation is that by which various products are obtained from the ground at about the same seasons of the year as the plants themselves would produce them if grown in their native climate and without human aid in hastening their vegetation ; such for example as beans, potatoes and other vegetables of a similar nature which grow and ripen in the open field, without labor other than that necessary for their planting ; these may be considered as the products of natural cultivation.

Early Cultivation is that by which vegetation is quickened by various artificial means, the principle one of which is the raising of the temperature, without however going so far as to completely change the order of the different phases of the development of plants, growing naturally ; their produce is only advanced a certain number of days ; this takes place in the growth of lettuce, which, being planted in beds at the end of the winter and covered with glass, will be fit to cut at a season when that grown by natural cultivation would have nothing but a few leaves or would be simply showing above the ground. The cultivation of early produce is of the greatest value to market gardeners who carry on their business in the neighbourhood of large cities.

Forced Cultivation, employing every method of increasing the temperature to the desired point, forces the plants to a certain extent to yield their fruits out of season. However,

there is nothing arbitrary about either of these three systems of cultivation, their limits are not clearly defined and every gradation is found between natural and early cultivation and between the latter and forced cultivation. We will take up and study each of them separately.

Planting.—Planting applies without distinction to all three above mentioned systems of cultivation. It has been referred to in a general way in a preceding chapter. We will not enlarge upon it here, but will describe the operations following the planting in ordinary cultivation. These are the transplanting, retransplanting the planting for growth without transplanting, top-dressing, etc.

A. TRANSPLANTING.—The object of transplanting is to encourage the growth of young plants by giving them more space than they had in the borders or beds in which they were planted. It consists in putting them down or transplanting them one by one in a nursery, allowing sufficient space between them to permit them to gain strength up to the time of their permanent planting. The taking up and transplanting should be done with the greatest possible care, either with the naked root, if the plant is of a kind which takes root easily, or better still, with the clod of earth attached so as to save the roots as much as possible. Transplanting may sometimes be dispensed with; for instance when the planting has not been too thick to allow the plants to attain sufficient strength to be put out immediately where they are to remain.

B. PLANTING FOR GROWTH.—When the young plant has grown strong enough in the nursery, it should be transplanted to the place where it is to remain and this operation requires an equal amount of care as the first transplanting. As a general rule a plant will take the better in proportion to the amount of fibres to its roots, they must therefore not be cut too short: still the ends of these roots are frequently trimmed off, in order to cause the formation of the fibres or to bring on a quicker taking root. Some delicate species of plants, melons for example, will only take root properly when replanted with the clod of earth at their roots; while others on the contrary suffer little or not at all from its removal. Too deep planting should be avoided, as well as the turning up of the roots or crowding them one against another.

The transplanting should always be followed by a light watering, especially if the plants have been taken up without the clod at the roots. Plants reset or transplanted where they are to remain are generally watered and protected from the full action of the sun. Some plants as for example peas and beans cannot be successfully transplanted and melons and cucumbers are best sown in pots and turned out without breaking the ball of earth or disturbing the roots.

C. TOP-DRESSING.—Top-dressing is in general use in kitchen gardening. It preserves the moisture in the ground, prevents its becoming hard after watering and hinders the growth of weeds.

The best top dressing is made from horse dung short and half decomposed, taken from old hot beds which have been broken up. Chopped straw is sometimes used, especially when it is desired to protect delicate fruit, such as strawberries, which should be kept as clean as possible, from dirt and stains from the ground. Top dressing is done either before or after planting, 6 or 8 lines in thickness and spread evenly over the ground. The advantages of top-dressing are particularly evident during the excessive heat of summer. Beds of leaves are also successfully employed in nurseries for fruit trees and ornamental shrubs. Covering with mould differs very slightly from top-dressing, the only difference is that in ordinary top-dressing, half decomposed dung is used, while in covering with mould, wholly decomposed dung is employed. It is spread in the same thickness as ordinary top-dressing and is more generally used in the spring than in a more advanced season, for the reason that retaining less moisture, the plants which it is intended to protect are less likely to suffer from the late frost of this season of the year. When the crops are collected and the land is ploughed these top dressings are ploughed in and then serve as fertilizers.

D. WEEDING AND THINNING.—Weeding comprises a light turning of the soil to break up the hard crust which forms on the top, and also to destroy the weeds. It is done with a sort of hoe described in the fourth chapter. Generally during the weeding, thinning takes place, of plants, the seed of which has been sown broadcast, and which crowd and injure each other; the weaker plants are rooted up, and a

proper distance is left between those which it is intended to preserve.

E. EARTHING UP.—Plants are earthed up by heaping round the foot of each plant a portion of the earth which separates them. The effect of this operation, more generally employed in extensive farming than in real gardening, is to induce the formation of new roots higher up on the stem than those already formed and to bring the latter nearer to the surface of the soil where they are more advantageously affected by the air and heat. Earthing up is particularly useful in the cultivation of potatoes, as it promotes the formation of shoots and underground branches upon which tubers, are formed.

F. PROTECTION. — Shelters of various kinds, either against cold, or heat or against too much light, are frequently employed in horticulture. We have already spoken of walls as being the best shelters known. But independently of walls, there are other shelters, less expensive and often only temporary, but which at the same time are of great value to vegetation. Straw mats set up and kept in position by pickets, in certain cases are a substitute for walls and bring forward the growth of plants, too far removed from the latter to derive benefit from them. Trees with thick foliage, planted in rows across the direction of the prevailing winds and close enough to one another to form a continuous barrier are of the greatest utility in countries where violent winds prevail during a considerable portion of the year.

G. ROTATION OF GARDEN CROPS.—A principle in agriculture, admitted for centuries, is that the soil requires rest after having produced one or several successive crops, especially crops of the same kind and to the knowledge of this fact is due the custom of allowing the land to lie fallow, a custom still in vogue in countries where agriculture is only slightly advanced. This impoverishment of the soil, is due to the fact that by the removal of the crops, it has lost the whole or part of the elements which gave it its fertility. This deficiency is made up by the employment of fertilizers, both animal and vegetable, and particularly by the rotation of plants or the alternacy of crops, the object of which is to cause fertilizing, or at least non exhausting kinds to follow those which take every thing out of the soil.

In gardening this effect is less felt than in farming ; this being due to the large quantity of manure used and to the great variety of plants which are grown. Nevertheless there are plants which occupy the same soil for many consecutive years, such as asparagus and fruit trees, and even with annual plants requiring much nourishment, the cultivation in the various divisions of the garden, is not changed every year, although there may be plenty of space to allow the alternacy of crops. This precaution is especially necessary with respect to fruit trees : A young tree should never be planted at the same spot where another had grown for several preceding years, not at any rate without bringing a considerable quantity of new earth to plant in. When it is a question of an entire orchard run out from age, many years should be allowed to elapse between the rooting up of the old and the planting of the new trees in the same place ; in the interval the land should be used for other crops.

K. COLLECTION AND PRESERVATION OF SEEDS.—The collection and preservation of plants, of their leaves, branches, fruits, roots, seeds, &c., completes the circle of cultivating operations in gardening. These operations which change with each kind of plant will be more fully described under each special culture ; here however we will give certain general precepts on the production and preservation of seeds, which play an important part in every kind of cultivation.

In all vegetable gardens of any extent and properly kept, a certain number of plants are always reserved for the production of seed. As far as possible only the strongest plants and those possessing in the highest degree the qualities of the kind required for reproduction, should be thus reserved. These plants so set apart are known in agriculture as seed bearing plants.

The particular care, required for seed bearing plants varies according to the species of plant, we cannot here go into this detail. We will simply say in a general way that when plants, comprising a great number of distinct varieties and whose properties are different, such as cabbage for example, are in question, the specimens of the different varieties reserved for the production of seed, should be removed as far as possible from one another, because, flowering at about the

same time, the pollen of these different varieties will mix, either from the effect of the wind, or from transmission by insects and that the seed resulting from this crossed impregnation will generally give a degenerate plant. The same remarks apply equally to varieties of plants of other families, which may injure one another by their proximity in growing, such as melons and pumpkins : we will return to this subject in its proper place.

In some plants the seed should only be collected at perfect maturity ; but there are many others where this last moment cannot be waited for, because the pods which enclose their seed open easily under the effect of dry warm weather and allow their contents to drop to the ground. In these plants the collection of the seed must therefore be made before complete maturity ; but in every case, the seeds must have reached their complete formation and only require to throw off the excess of moisture they contain, to become perfectly ripe. The plants are then cut close to the ground without removing the pods and they are allowed to dry upon a cloth spread out in the sun or in a dry, well aired room. The seed in this way completes its ripening and none is lost when the pods open.

The care necessary for the preservation of seed is told in a few words. It consists in keeping the seed free from moisture and free from too great changes of heat and cold and in protecting it from destruction by animals or insects. Under these conditions seed generally keeps well in ticketed paper or linen bags. But whatever care may be taken, most seed loses its germinating power in a few years : it should therefore never be allowed to become very old.



SECOND PART

APPLICATION OF GENERAL PRECEPTS SPECIAL CULTURES

CHAPTER ONE

Vegetables ; definition of — Cabbage ; origin of — Varieties of cabbage reduced to five principal classes, characteristics of these five classes, notable varieties in each class — Cultivation of the cabbage — Preparing the ground — Sowing — Cultivation of the headed cabbage, of the Savoy cabbage, &c — Cultivation in hot beds and in the spring — Taking in and keeping the crop.

We will now treat of the particular methods of cultivation of the different kinds of vegetables which are the foundation of a system of paying gardening. These we will divide into two groups, vegetables and fruit trees.

The name of vegetable is given to all herbaceous plants cultivated from an economic point of view, even to those the fruits of which may be eaten raw, such as strawberries and melons ; under the name of fruit trees are comprised all the trees or shrubs with fibrous or woody stems or trunks, no matter what their nature or their manner of vegetation. We will begin our review with vegetables properly so called, placing in the first line those whose leaves, stems and roots are valuable products and finishing with those whose products more closely resemble those of fruit trees.

CABBAGES—CAULIFLOWERS—BROCCOLI

A.—SPECIES AND VARIETIES

Cabbage is the chief of vegetables; its abundance of production, its excellence from an economic point, its wholesomeness as well as its facility of cultivation will always entitle it to first rank in the vegetable garden.

The cabbage grows spontaneously on the borders of the sea, in localities impregnated with salt, a circumstance which

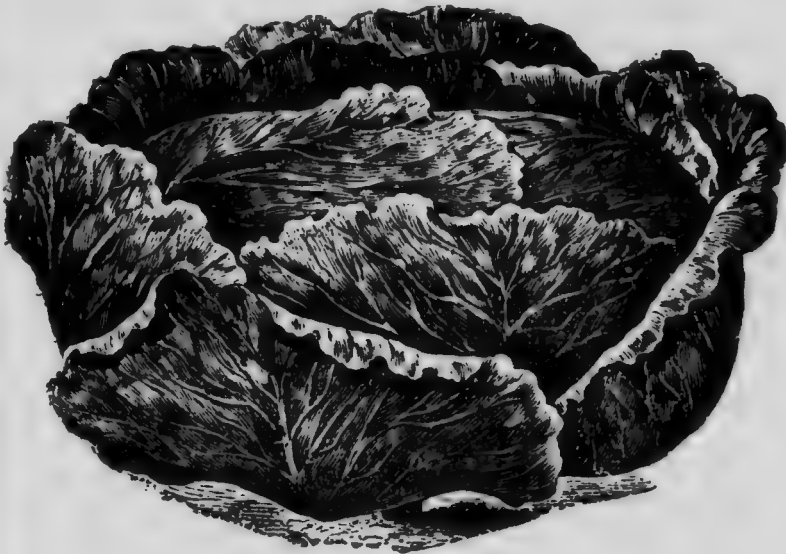


Fig. 15.—Large Headed Cabbage.

explains its more ready growth on grounds in the neighbourhood of human habitations, where the passage of animals to and fro always leaves a certain amount of saline substance, and for the same reason they flourish in rich fertile and well manured soil.

The length of time during which the cultivation of the cabbage has been carried on, has given to this vegetable at first a single species of plant, an almost endless number of kinds and varieties with different properties: we will consider those of the highest interest, following the classification proposed by Mr. Vilmorin in late years.

This celebrated horticulturist divides cabbages into five classes, as follows: 1. The headed cabbage, with smooth

leaves generally of a green color tinged with blue ; 2. Savoy cabbages, more or less headed with large leaves, generally deep green in color ; 3. Green cabbage without any head, which will keep for three years or more ; 4. The root cabbages comprising the various varieties of turnip and radish cabbages ; 5. Lastly the cauliflowers and broccoli.

First class—The headed Cabbage (Fig. 15)—This cabbage, cultivated in every garden and known the world over, is subdivided into a great number of varieties the principal of which, in the order of their coming to maturity, are 1st the York cabbage, a very early and much valued variety, with a small elongated head. It has some



Fig. 16.—Saint Denis Cabbage.

sub-varieties, of which the early dwarf and the large York are the best known. 2nd the Early Jersey Wakefield. 3rd the large white headed cabbage, which gives the largest number of sub-varieties, such as the cabbage of Saint-Denis (Fig. 16) or the White cabbage of Bonneuil, with a large head slightly flattened ; the large headed cabbage of Alsace, round and one of the earliest of that section of country :—the conical cabbage of Pomerania ; the large Dutch, the head of which grows to an enormous size in good soil ; the Dwarf Dutch, of medium size and one of the earliest of the headed varieties ; the red Dutch Cabbage.

Second Class.—SAVOY CABBAGE OR CURLED COLEWORTS.

These are easily distinguished from the cabbages of the first class by their curly or wrinkled leaves. They head like the others, but the leaves of which the heads are composed are never as close as those in the properly called headed cabbage. Their flavour is also generally sweeter than that of the latter kind. The principal varieties of this group (Fig. 17) are the very early Savoy Cabbage,



Fig 17.—Early Savoy Cabbage.

it has a short stalk, ripens early and is of excellent quality :— the Dwarf Savoy and the Savoy of Tourain, both having low stalks and being early in heading —the ordinary Savoy Cabbage or the large Drum head Savoy, with larger head than the two preceding kinds :— the Savoy des Vertus, the largest of this class and comparing favorably as to size with the finest headed cabbage :—lastly the Brussels sprouts, which, instead of growing one head as do the other varieties, grows a great number of small ones, which are cut off for use as soon as they are large enough ; this is an excellent vegetable not cultivated extensively enough in Canada. (Fig 18).



Fig 18 —Brussels sprouts.

Third Class.—GREEN CABBAGE OR CABBAGE WHICH DO NOT HEAD.—This class, in which are included all kinds of cabbage which do not head, is more of an artificial than a natural growth, as, besides the absence of the head, characteristic of the two preceding classes, it shows the greatest difference from them in its shape, color and economic properties. These kinds are rarely cultivated in gardens and are generally intended for feeding cattle.

Fourth Class.—KOHL-RABI OR TURNIP-ROOTED CABBAGE ARE THOSE WITH LARGE STALK.—Cabbage of this class are easily distinguished from those of the three preceding classes by the enlarged condition of the stalk and root, which becomes the valuable part of the plant: together with the others they occupy a high position in the economy of the vegetable garden and are not less valuable on the farm.

The principal varieties of this group are : the cabbage of Siam or swedish turnip the stalk of which swells above the ground and forms a ball from the top and sides of which the leaves grow out ; the turnip rooted cabbage some times called the cabbage of Laponie, the enlargement of which takes place under the ground and forms a large pulpy root, not unlike an elongated turnip, and which stands the most extreme degrees of cold.

Fifth Class.—CAULIFLOWERS AND BROCCOLI.—Up to the present we have considered the classes of cabbage, whose product is formed from the leaves or enlargement of the stalk or roots : in those of the present class, the flowers or rather the whole system of flowering yield the really valuable part. This class is divided into two groups, the true cauliflower and the broccoli.

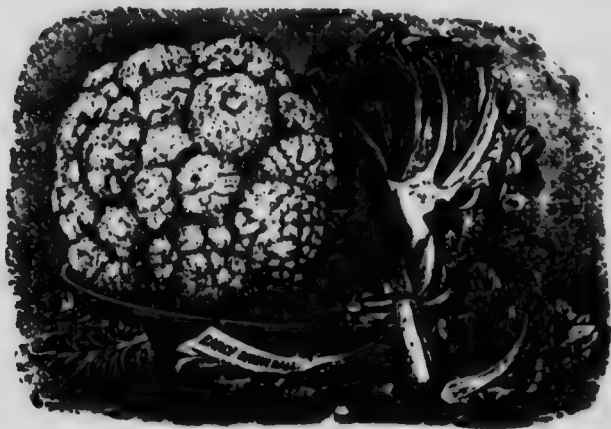


Fig 19.—The Salomon Cauliflower.

Cauliflowers have smooth long leaves, rounded head and are generally of a yellow white color. There are several leading varieties, such as : (Fig. 19) the tender cauliflower or the Salomon; the Lenormand, highly recommended (Fig. 20) the semi-hard and the hard, to which may be added the cauliflowers of Malta, of Cyprus, of Holland and of England, all these varieties differing little from one another except in quality.

Broccoli are different from the preceding species in that their leaves are wavy, their heads more voluminous and their color not the same as that of the true cauliflower, the principal varieties are the white Broccoli of Holland, the broccoli of Denmark the pale green heads of which are very large. The Portsmouth sulphur and the Chapyrell sulphur, &c.

B. MANNER OF CULTIVATION

Preparation of the ground.—With the exception of very wet ground, where the water remains stagnant and of

pure silicious sand, the cabbage will succeed everywhere with proper fertilizers. However deep rich soils are preferable for their growth; a very loose soil is more suitable for the varieties with enlarged and down growing roots such as the turnip cabbage. Before the planting of any kind of cabbage, the soil should be properly loosened, by being broken up at least twice, once with the spade.

Cow manure is superior to all others for the cultivation of every variety of cabbage, still in a cold clay soil, stable manure or horse dung may be used advantageously instead and will greatly increase the successful cultivation especially if to the ordinary manure is added the scraping of city streets

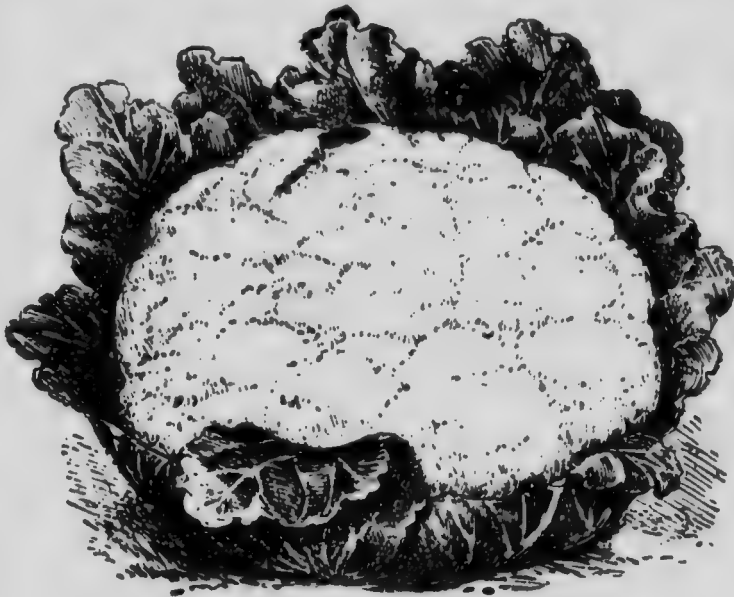


Fig. 20.—The Lenormand Cauliflower.

and the deposits from ponds and ditches, which always contain a certain proportion of saline principles extremely favorable to the growth of these plants.

Planting.—In planting cabbage, the good quality of the seed is an essential to success. Cabbage seed is of a uniform color, very dark almost black. When a considerable portion of the seed is reddish it is a proof that it has been collected before complete maturity in which case it will come up un-

evenly. Seeds which appear wrinkled and dried up should be put aside as generally the germ has not been sufficiently formed and that they are not likely to come up at all.

The moment it comes up, the cabbage plant is subject to the devastation of numerous insects, the most dangerous of which is the *cabbage flea*, which settles often in millions upon a bed or border, and not a single leaf escapes. The cabbage in such cases will infallibly be killed, unless the insects are speedily destroyed. Not in spite of all the care possible, success is not always obtained.

Root Worms, and how to deal with them.—The best results have been obtained by a mixture of 4 ounces of kainit and 4 ounces of hellebore in 2½ gallons of water, one half tea cup full of which should be poured round the foot of each plant, the soil having been previously removed as far down as the true root: this application should be made at once on the presence of the worms being noticed. An infusion of 4 ounces of hellebore to 10 gallons of hot water may also be used.

Another effectual remedy consists in sprinkling ashes over the young plant during the morning dew, and above all in quickening its growth, for as soon as it has put forth its fourth or fifth leaf it has acquired sufficient strength to resist the attacks of the insects, which can then no longer do it any serious injury.

To protect cabbages from worms, caterpillars, etc., the plant should be sprinkled from time to time with a mixture of poultry dung and water. Throw three or four buckets of boiling water into a barrel; shake up well, then allow to settle for 26 hours; sprinkle this liquid over the heads of the cabbage with a watering pot with a rose. Pour more hot water on the sediment deposited in the barrel and repeat the watering every four or five days.

A sprinkling of an emulsion of petroleum or a solution of whale oil soap in the proportion of one pound to six gallons of water is used in the month of August when the earth fleas begin to appear. Owing to the rigor of our climate cabbages are planted in the spring in hot-beds between the 10th and 20th of April, if they are wanted early. Plants put into the open ground will only come to maturity in the autumn. It is therefore better to sow in hot-beds in rows six inches apart and as soon as the plants are big enough to

be handled, they must be thinned. The thinning of the plants before they become too large, is of the highest importance for a delay of a day or two is quite sufficient to convert strong healthy plants into slender weaklings. From this time forward the plants are given air whenever the weather will permit and when the season becomes favorable, generally about the end of May, the plants should be transplanted into the open ground in rows three feet apart at intervals of $2\frac{1}{2}$ feet in the rows; but to simplify what we have to say upon the subject and to omit nothing essential in the other portions of their cultivation we will treat separately of each of the groups we have mentioned above.

The products succeed one another in the order of the earliness of the species and of the periods of planting. The York cabbage, the earliest of all and perhaps one of the best, commences to head about the end of June, then come the sugar loaf and the ox heart and finally those planted in the spring in borders or in the open ground.

All the savory and headed cabbages and especially the large headed cabbage, require good ground, firm and well manured, they succeed best in a cool well loosened soil. The spring and summer plantings should be slightly shaded at first and all should be plentifully watered according to the exigencies of the season. They must be examined to destroy insects which at times are most injurious; the best way to get rid of them is to sprinkle the young plant with ashes in the morning dew. When transplanting, the foot of the plant where it leaves the root should be examined and if an enlargement is found it should be cut in half and the worm occasioning it should be destroyed as it would stop the growth of the plant; each plant should be watered at the moment of planting and the watering should be continued as the season demands. In localities where there are heavy frosts as in our climate, at least a portion of the cabbages are put into dry cellars for keeping, or are planted close together in sand or earth. All cruciferous weeds, such as Charlock, should be vigorously destroyed in the vicinity of a cabbage patch, and they should be burnt as a means of preserving future crops from the embryo insects they might harbour.

Cauliflowers, Broccoli.—The cultivation of cabbages of this category is somewhat more difficult than that of the others, on account of their more delicate nature. All require

good ground, smooth and well manured, copious watering and a moist temperature rather than a dry hot air ; therefore they are more successfully cultivated in the spring (forced culture) and autumn than in the summer.

a. Spring Sowing for Summer Harvesting —Sowing should be done at the end of March in hot beds or under glass. Three weeks after, the plant should be put down again in another bed under glass or with the shelter of straw mats. At the end of May it is set out and it will head in June or July.

b. Summer Sowing for Autumn Harvesting.—This sowing should be done during the first fifteen days of June in shaded beds or borders protected by mould, they are then set out in July, without any previous transplanting. This is the most simple cultivation of fall, but on account of the great heats of the season, they must be frequently and abundantly watered, especially during the very dry months. Cauliflowers treated in this way will yield their heads from the end of August to the end of September. The later ones may be preserved for winter consumption and for this purpose they should be cut from the stalk at the width of three fingers below the head and after the removal of the large leaves, they should be placed in cellars upon shelves, or, better still be suspended from the ceiling. Treated in this way they will keep for a fairly long time.

CHAPTER TWO

Celery — Lettuce — Chicory or Endive -- Salad — Dandelion — Garden Cress—Nasturtium and other Dressings— Cultivation of these Different Vegetables.

Celery is a native plant of Great Britain, which from time immemorial has passed into the economy of cultivation in which it has become one of the choicest vegetables. There are several varieties differing but slightly from one another, the stalks and leaves of which alone are edible. We will treat all these varieties as one which we shall call ordinary celery, to distinguish it from the celery-radish the root of which, grown large and pulpy like that of the turnip rooted cabbage, is the valuable portion.

a. Ordinary Celery.—It is sown at different seasons and so long as the cold is felt, it should be sown in beds and under glass ; the beds should be thinned, when the plant has thrown out two or three leaves. In the Province of Quebec it should only be sown in beds, the fine season being generally too short to permit of its being sown in open ground.

The following varieties, which have given good results, have been sown in hot beds on the first of April, transplanted under plain glass on the 19th April and retransplanted in trenches on the 12th June.

	Ready for use	Remarks
Giant Pascal	29th Sept....	Large and full.
Paris red stalk.....	do	Extra fine.
Solid white giant.....	4th Oct....	Good.
Streaked white.....	1st Aug....	Extra fine.
Paris yellow golden.....	29th Aug....	do
Henderson streaked pink	do ...	Good.

The soil intended for a celery plot should combine certain conditions essential to its successful cultivation ; it should be deep, fertile, rather moist than dry and well broken up. There are various ways of preparing it for the planting of celery. In every case it is so arranged as to have a certain quantity of ground at disposal for earthing up the plants and causing them to whiten. Sometimes the celery beds are separated from one another by other beds of the same size, planted with lettuce, chicory, &c., the earth from which, after they have been taken up, is used on the celery beds for earthing up ; at other times, trenches of 3 or 4 feet in width are dug to a spade's depth : the bottom is then well loosened and lined with manure and three rows of celery are put down and when earthing up, the earth which was thrown out when digging the trench, is thrown back into its former position, so as to partly bury the plant ; lastly another plan is to dig simple furrows, between which the earth which has been thrown out is piled in the form of a shelving bed ; this earth

is afterwards used for earthing up the celery, planted in the bottom of the furrows when grown sufficiently to require it; sometimes the heads of celery are simply bound round with three bands of straw, which hold their leaves together and earthed up with ground taken from between the plants, three times in succession at intervals of eight days, so that the tops alone of the leaves are above the ground.

Celery requires quantities of water; besides the watering which immediately follows the planting and which is necessary to its taking root, it should be watered every two



Fig. 21.—Celery.

or three days and sometimes oftener, if the weather is dry. The plants should be earthed up, when the leaves are twelve inches long; its effect is not only to whiten the leaves, but also to force them to lengthen to a considerable extent. (Fig. 21).

Rust of the leaves. This disease sometimes causes serious damage. Leaves badly attacked must be removed,

upon the first appearance of the disease, the best way to check it, is by the use of Bordeaux mixture. Celery is very sensible to the cold. When there is a root house or a good cellar convenient it may be taken there a little before the frosts, and whitened by being partly buried in sand or light earth moderately dry.

The diseases to which celery is subject are caused either by fungous growths or insects; of the former damping off, of the seedlings and leaf spot are the most injurious; to avoid damping, sow the seed in shallow trays with holes in the bottom; then instead of sprinkling the surface, sink the tray in water until the soil is moistened all but the surface which remains dry, do not allow the trays to stand in any cold draught or in a place where the temperature suddenly changes. The leaf spot makes its appearance after the plants have been set out and at all seasons when conditions of climate are favorable to its development. Bordeaux mixture, frequently applied, will be useful in checking it. Black rot, comes to celery stored in too close, ill ventilated, warm, and damp places, and by wetting the leaves, it can only be prevented by proper storage and care.

The insect foes of the celery are, *Celery-fly* or *celery leaf miner*, this often appears while the plants are quite small and eats the leaves as fast as they are produced. Sprinkling with tobacco water and in a short time after, with pure water and pushing off the injured leaves which are not all eaten will be found beneficial.

The celery leaf tyer this insect is not much known as yet, but has become troublesome in some localities not so much by eating them as by tying the leaves together and thus preventing growth. Hand picking and spraying the underside of the leaf with Paris green, if this can be done before the edible part of the celery is formed, is recommended as a cure for this pest.

The celery stem fly *Prophila apii*, this curious pest burrows in the stem and eats its way upwards, it is therefore most difficult to reach, spraying with coal oil emulsion may have a little effect in checking it but the only way to prevent its spread is to dig out and destroy by fire all diseased plants, otherwise the whole crop may be lost. After

the crop has been dug, all celery beds thus affected should receive a good dressing of quick lime and soot or wood ashes.

The celery caterpillar feeds upon the leaves but is conspicuous and not very numerous, therefore it can be easily kept under by hand picking.

Grasshoppers eat celery plants and where there is nothing to prevent may be poisoned with Paris green, but not where there is any poultry which would eat the dead insects and be poisoned by them.

b. The celery radish is an excellent vegetable, but too little known; it is largely cultivated in Europe. Its root attains the size of a man's two fists, it is tender and mellow and of a much sweeter flavor than that of ordinary celery. For the successful cultivation of this variety a deep, cool, well broken and manured ground is required, it also requires copious watering. The best system of watering is by irrigation which allows a considerable quantity of water to remain round the foot of the plant. The ground should be turned over two or three times, but no earthing up is necessary because it is a root and not leaves that are wanted. The sowing is similar to that of ordinary celery; in setting out a distance of 15 inches is left between the plants. These roots may be kept in the cellar or root house, by burying them in sand after removing the leaves.

SALADS AND DRESSINGS.—Under this heading are included all vegetables which are eaten raw, made into salads; only a few are better when cooked, we will only refer here to such as it is of most importance to know.

§ 1. **LETTUCE.**—Few vegetables through cultivation have produced a greater number of varieties. All these varieties however may be brought down to two distinct types, the headed lettuce and the Roman or Coss lettuce; the first are distinguished by their depressed rounded shape somewhat resembling that of the cabbage; the others have straight leaves growing long and close to each other.

a. Headed Lettuce.—This variety is further divided into three groups, the spring, headed lettuce, the summer

lettuce and the winter lettuce. Each of these groups comprises a certain number of sub varieties, the principal of which are treated of (Fig. 22).

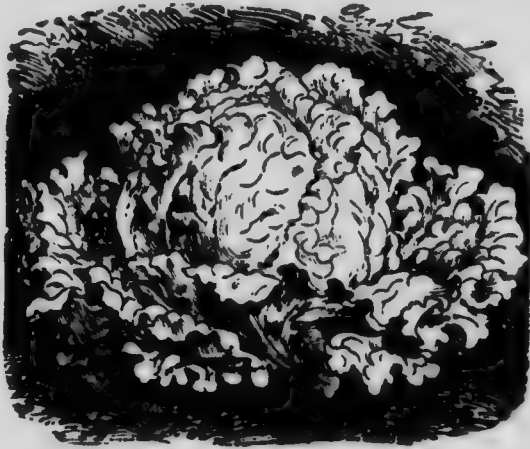


Fig. 22.—Lettuce.

The principal varieties of lettuce grown in Canada are :

The Simpson (black seed), the New York, the Tennis ball, the Salamander and the Golden Queen. The Roman or Coss, the green kitchen garden lettuce and the Paris Coss.

But there are many others such as the Royal, the Maltese, the Batavia, the Passion lettuce, etc.

The lettuce sold by kitchen gardeners under the name of lettuce for cutting young, does not form a separate group from those above mentioned. They give this name to all lettuce which is cut off at the neck as soon as it has put forth its fourth or fifth leaf and when it is intended for early use, it is sown very thick. All the varieties above described may be treated in this manner, but the Salamander and the Golden Queen are generally preferred. A third variety (*laitue épinard*) spinage lettuce is also very suitable as lettuce for cutting young, as after being cut it grows again from the foot and thus yields several successive cuttings.

This must not be confounded with spinage or spinach which is quite a different vegetable, not eaten as a salad but must be boiled.

B. Coss lettuce.—There are also several varieties to this species of which the following are the best liked: 1. The white Paris Coss very good and heading without requiring binding; 2. The green Coss lettuce, also heading without binding and particularly valuable as an early variety; 3. the gray Coss, the largest of all and having the same properties as the preceding; 4. the red winter, little affected by cold; 5. the Brunoy light Coss, which is very large and closely resembles the two preceding.

C. The Cultivation of Lettuce.—It is very simple and with a slight difference the same for all the different varieties. Spring and summer lettuce is sown in April in beds with a favorable aspect and is transplanted in May; or else—it is sown in May, where it is to remain, among onions and carrots: in the latter case it must be sown thin and only the small varieties must be used, so as not to injure the other vegetables. The sowing of summer lettuce may be continued up to July.

Roman or Coss lettuce is cultivated in precisely the same way as the headed variety.

§ 2. **CHICORY-ESCHAROLE.**—Under the name of chicory three very distinct principal varieties are included,—wild chicory, cultivated chicory, and Escharole or Batavian Endive. The first is very bitter in flavor and is cultivated as a salad to be used either green or bleached. For the first purpose, it is sown thick, to be cut, like small lettuce when the leaves have reached 5 or 6 inches in length; for the second it is bleached in the cellar by close planting in moist sand; it whitens, lengthens, loses part of its bitterness and is delivered for use under the name of barbe de capucin. This salad is particularly valuable in the winter when most of the lettuce is used up or out of season. Wild chicory is also used for another purpose; it furnishes the roots from which chicory coffee is prepared. Cultivated or white chicory is much superior as a salad to the wild variety; it is even preferred to the best lettuce. It is easily known by its leaves which are slashed, wrinkled and glossy. There are several varieties, the Italian chicory being the most liked, as it is the least liable to run to seed.

The Escharole or Batavian endive is very similar to the white chicory; it differs from it only in the leaves which

are straight and perfect or but slightly slashed; it has the same taste and properties. Two varieties in particular are cultivated; the large Escharole which gives large heads and the round species which is smaller but grows much faster.

Chicory and escharole are cultivated in the same way. The sowing for early use, begins in April and is done in beds and under glass; it is put into the open ground at the end of May. Sowing in the open ground is done in this latter month; it is generally put down in a shelving bed facing the south; at a more advanced season of the year it is simply sown in a border in light smooth mould; it is weeded and thinned when necessary so as to obtain a strong plant; when it is strong enough, that is at its seventh or eighth leaf, it is set out angleways at one foot in every direction. The placing of straw over the beds is advantageous; the straw favors vegetation and retains the effect of the watering which should be frequently repeated. When the plants are well supplied with leaves, each one is tied up with a twist of straw to cause the leaves to whiten or at least those near the heart of the plant, this will take place in about fifteen days. This operation should be done in dry weather and the watering afterwards should be very moderate and only at the foot of the plant, without wetting the leaves, so as to avoid decay. At the end of the season any of the plants that are left may be put into the cellar or root house and half buried in sand, they continue to grow and may be kept until the month of January.

§ 2. DANDELION, GARDEN CRESS AND NASTURTIUM.—

Besides the plants spoken of above, there are others which are used, although less frequently in the composition of salads, either alone or mixed with lettuce or chicory, such as the following.

a. Dandelion.—This plant, known by every body, would be one of our best salads, if more generally cultivated. It is usually gathered in the field or along the fences in the spring while the leaves are still tender and but slightly bitter. The best are those, which having been accidentally covered over, have whitened like the chicory. In cultivating the dandelion, it should be forced to whiten so that all its best qualities may be obtained.

b. Cress.—Water cress has been used from time immemorial both as a food and a medicine. For many years past

it has been cultivated in localities where there are streams of spring water, especially if the close proximity of a town, assures the sale of the produce. The trenches dug for the plants are called cress-beds.

Other plants quite different from the above also bear the name of cress, such as the garden cress and the garden *rocket*, these are used in the making of a salad, as a kind of dressing. As the use of these plants is very limited, only small quantities are sown at a time, but to enjoy them throughout the fine season, the sowing should be repeated every fifteen or twenty days. Garden cress is seldom planted except in rows or in fringes along the borders.

c. Nasturtium. — The same remarks do not apply to the *Nasturtium*, the bitter and aromatic flavor of the flowers causing their frequent use as a salad. This plant is sown about the end of May or the beginning of June, after the frosts, in good ground and with a Southern aspect ; as it is a clinging plant, it is given supports round which it may twine or better still it is sown in proximity to a lattice or trellis to serve as a support.

CHAPTER THREE

Parsley, Chervil, Sorrel, Spinage, Beets, Onions, Shallots, Chives, Garlic, Leeks, Asparagus — Cultivation of these vegetables.

PARSLEY.—Among garden plants it is one of the most generally employed as a seasoning and in consequence it holds a prominent place in the vegetable garden. During the whole of the fine season it is sown along the borders of beds of other plants, the manuring and watering of which are of great benefit to it ; but besides this, it is well to have a reserve for the needs of winter consumption, a time when it is costly and difficult to be had.

The seed ordinarily takes one month to come up and does not keep more than two years. It is sown between June and August in a good loose soil. Parsley only goes to seed during the second year ; but by frequently cutting the leaves and continuous watering during the heat of summer, it is prevented from seeding and in this way it is made to last for several years.

A novel method for the cultivation of parsley has been started, it consists in the use of large vessels or barrels, pierced with holes in the sides, in which are planted an equal number of heads of parsley. These high vessels which are called parsley-boxes, become covered with the leaves of the parsley over their whole surface and will furnish all the necessary seasoning for the preparation of the food during the whole winter, but they must be kept out of the way of frost; therefore they are generally placed in the kitchen, near the windows, so that they may receive light — of course these vessels must be filled with good ground and must be watered as often as they require it. Boxes of 6 or 7 inches in height may also be used into which the parsley plants are reset and in which they develop in the same way as in the parsley boxes above mentioned.

The principal varieties of parsley are the common parsley, the chief characteristic of which is its hardihood, the curled parsley and the dwarf curled variety, remarkable for the beauty of its leaves and its slowness in seeding: the large rooted parsley, the large root of which is eatable; lastly the English large leafed parsley, a handsome and most productive variety, generally used for cultivation in the parsley boxes.

CHERVIL.—What has been said about parsley applies in almost every particular to chervil with the difference that the latter is even more hardy. It is reproduced from seed collected the same year as the sowing and which may be kept for three years. It can also be raised by dividing the roots.

Parsley and Chervil are so like a well known wild plant called small hemlock, as to be almost taken for it. The latter plant is a violent poison and has often been the cause of accidents through mistakes to which it has given rise. It should therefore be well known, so as to be exterminated with the greatest care from the parsley and Chervil beds.

Sorrel is a very hardy plant which requires little cultivation. It is almost always planted in the borders along paths; but it is also often sown in beds, because not being simply a seasoning and being frequently used like spinach, a certain quantity is always required; its use is not general in this country.

The selection of sorrel is not a matter of indifference; some kinds are more acid and some are sweeter than others. That most generally cultivated is the Belleville sorrel, having larger leaves and being less acid than common sorrel. Both are sown broadcast in beds or borders in the spring or better in the autumn. They grow in all kinds of ground, but a light deep soil neither too wet nor too dry is the best. They can also be grown by dividing up the roots; this is the best way of growing, especially for such varieties as it is desired to keep pure, as they easily degenerate when grown from seed. Among the other varieties may be mentioned the virgin sorrel which has leaves of a paler color, larger and but slightly acid.

SPINAGE OR SPINACH.—An excellent vegetable, more of which should be found in our gardens. There is a large consumption of spinage in the towns especially during the heat of summer, a season in which light and cooling food is best for health.

There are two principal varieties of spinage; one having a thick seed and the other a seed which is smooth and glossy. Among the former may be mentioned the common spinage and the English spinage, with larger and thicker leaves. Among the other kind are the round spinage or the spinage of Holland, the Savoy Spinage, the finest and most productive of all the varieties, the victoria spinage with leaves like lettuce and the Gaudry spinage which differs but little from the latter variety. The two last are large plants well furnished with leaves and their cultivation is to be recommended, as also is the New Zealand, which endures heat and is the best for summer. As spinage only last a short time, to be always provided with it, it should be sown every 15 days from May to August in rows one foot apart in a light manured soil or at least the soil should be moist. The summer sowing should be in shaded beds.

TETRAGONIA.—This variety will take the place of ordinary spinage in the hottest months of summer or in dry and arid places where the ordinary spinage will not do well; it is sown in the month of May in beds or in the open ground and it continues to produce during the whole summer without any further attention.

Beet (pear shaped) this is a variety if the beet-root the leaves of which are often used to correct the acidity of the sorrel. It is however very little used. It is quite different with the rib-leaf beet, which, apart from its leaves which can be used for the same purposes, furnishes an excellent food, it is large and tender and may be eaten in the same way as asparagus; It should be more largely cultivated; it is sown at the end of May and requires no attention, except thinning, so that the leaves may have necessary space, and watering.

ONIONS.—Onions are one of the most important products of the vegetable garden, their cultivation, which reaches back to the remotest antiquity, has given rise to a great number of varieties. The most common is the brown onion of Australia. (Fig. 23.)



Fig: 23.—The Australian Brown Onion.

This new onion is of a good size, a little thicker than the Wethersfield, has firm and heavy flesh and a fine appearance on the market. Growing fast, it ripens perfectly two weeks before the red Wethersfield. Owing to its weight and firmness, it keeps longer than any other variety. The peel is of a clear brown amber color.

THE CANADIAN (Fig. 24.)—Red in color, flat, of rapid growth, medium size, excellent quality, ripening perfectly and rapidly and keeping well, it is recommended for localities where the Wethersfield does not easily reach maturity.



Fig. 24.—Canadian Onion.

THE YELLOW DANVERS.—The true Danvers is a fine onion: very thick, of good size, white flesh with a thin clear yellow peel. It is very popular in Western Canada.

THE WETHERSFIELD.—This is the best variety for this country and the most productive: The bulb is large and thick, the flesh white with a slight violet tint; the peel is deep red and violet in color; and it is an onion of very strong flavour.

THE PICKLING ONION.—Although very much smaller than the others, it is by no means of less value in the household. It is cultivated in the same way as the other varieties. At the same time owing to its size it requires less thinning. (Fig. 25).



Fig. 25.—Pickling Onion.

Apart from a few varieties, such as the bulb bearing onion and the potatoe onion which are reproduced from suckers or small bulbs which they throw out, all the other varieties are grown from seed and to speak truly, sowing is the only method of reproduction of

onions employed in gardening.

The ground in which onions are to be sown must be well ploughed and carefully cleared of all stones and roots which may be found. Although the ground must be broken up before the sowing takes place, it must have a certain amount of solidity for the kind of cultivation in question, therefore it should be allowed to settle for eight or nine days.

It has been remarked that onions succeed better after they have been cultivated in the same ground for several years. Some gardeners manure the ground immediately before sowing ; others hold that a crop should be taken from the manure, before the onion seed is put in. The sowing is done broad-cast, or in drills or rows to facilitate weeding and thinning, more or less thick, according as the intention is to use the onions during the summer while they are young, or to allow them to attain their full size ; in which latter case, successive thinnings should take place as fast as the young onions become fit for consumption.

Usually, after the seed has been scattered on the beds, the earth is trodden down under foot or pressed down with a roller. The object of this proceeding is to put the seed into as close contact with the soil as possible. Without this precaution it would come up very unevenly, and a good deal of it would not come up at all ; the covering of the seed is completed by levelling the soil with a rake. Notwithstanding every precaution which may be taken in the sowing of onions ; they always come up more or less unevenly, and they must be thinned at least once, whether it be intended to allow the plant to mature or not. To overcome this difficulty, of late years, the seed has been sown so thick, that the bulbs cannot develope ; when they have become the size of a pea, they cease growing and when they have attained a kind of maturity, they are taken up and preserved dry, to be planted the following year in rows, 5 or 6 inches apart in every direction according to the size of the variety. Treated in this way onions give a more certain and abundant crop, than they do from ordinary sowing.

In this country, the cold weather of the autumn or even the first frosts often come on while the onions are still green and in full vegetation. If gathered in that condition, it would be impossible to keep them through the winter. Their maturity is artificially hastened, by twisting the leaves in the hand, or by bending them down to the ground, by means of a light roller, an empty barrel, for example, rolled over the bed. After the onions are ripe and have been pulled, they are allowed to remain on the ground for some days, after which they are taken in on a dry day.

SHALLOTS.—Shallots are grown from their bulbs. They require a good fresh soil, manured the year before ; fresh

manure as well as wet land being bad for the cultivation of shallots. They are sown in beds, near the top of the ground three inches apart in rows 15 inches apart in May and also in August to have new shallots on the disappearance of the snow in the spring. In July or August after the leaves have dropped, they are pulled and after being allowed to dry for some days upon the ground they are put into a dry place. During the winter they should be kept dry and protected from the cold.

JERSEY SHALLOTS.—They are a new variety differing from the ordinary shallots in many particulars especially in the color of the leaves and stalks. They mature earlier, which gives them real value, but they are harder to keep. They are cultivated in the same way as the ordinary kinds. The Jersey shallots are the only kind which ordinarily give seed. Sown in the spring they produce a fair sized bulb in the same year.

LARGE SHALLOTS OF ALENÇON.—Another variety resembling the preceding in its leaves, but the bulbs of which, although taking longer to form, become much larger than the others. They are the largest we know of and also the quickest in growth.

CHIVES.—A perennial plant used for seasoning. It is reproduced from seed and requires a light well prepared ground. Generally two heads are replanted close together to form tufts which should be at a distance of a foot and a half from one another. They may be cut whenever required, and by careful watering they may easily be kept in a flourishing condition.

GARLIC.—Garlic is a plant cultivated for its bulbs, also called cloves, the odour and flavor of which are strong, Garlic is only used for seasoning.

The bulbs are planted in beds, or better in borders one foot apart.

When the stalk has reached the length of over a foot, the leaves and stalk are knotted, to stop their vegetation for the benefit of the bulbs.

When the leaves have withered, the plant is pulled up and allowed for some time to dry in the sun, after which it is tied into bundles and hung up in a dry place.

Garlic requires a strong soil, without much moisture. For garlic, horse dung suits better than all other manures.

THE LEEK.—As a vegetable the leek has not the same importance as the onion and still it would be hard to do without it. It is biennial, that is to say, it only seeds every second year. To obtain seed, the leek of the preceding year must be planted in the spring.

The principal varieties are :

The ordinary long leek which may be sown in the open ground ;

The large short leek of Rouen has a shorter root and is larger.

The yellow leek of Poitou as indicated by its name this variety is of French origin. With fair ordinary cultivation this leek attains a diameter of two to three inches while its whole height is not more than one foot. The leaves are long, very large and soft. It has a distinctive color a pale green almost yellow.

The yellow leek of Poitou is a rapid grower which makes it profitable for summer and autumn sales. In quality it has no superior.



Fig. 23.— Large Short Leek of Rouen.

THE CARENTAN. — A French variety superior to the large leek of Rouen. Very large and short it is of a sup-

erior quality; it is very suitable for sowing in beds, to be afterwards planted out and carefully cultivated (Fig. 26). This leek should be planted in rich ground manured the autumn preceding the planting. Cow manure should not be used but horse dung is favorable to its growth as are also wood ashes and decayed vegetable matter. The ground having been broken up the seed is put in after the 20th May either in rows or in a nursery. When the plant has grown as thick as a pen handle, it is replanted, if possible in cloudy or rainy weather, in rows and beds 5 inches apart every way, this after the ends of the roots and leaves have been cut off. During the summer they are hoed and weeded and often watered especially during dry weather. By the cutting off of the ends of the leaves three or four times, the stalk is made to grow larger, at least so say the gardeners. They are gathered as fast as the stalks become of sufficient size. Leeks of the end of the season may be preserved in the cellar like most other vegetables, for the use of the family. The seed of the leek will not keep for more than two years.



Fig. 27.—Asparagus.

ASPARAGUS.—Asparagus is one of the best vegetables of our gardens, the produce of which is most assured and

which there is the best chance of selling at a profit especially if grown within reach of a large town. The small space it generally occupies in the vegetable garden, would therefore be a matter of astonishment, did we not know that its cultivation requires a considerable outlay which is not returned to the gardener until after four or five years.

There are two methods generally followed for starting asparagus beds ; by sowing and by the planting of roots. These branching roots from which the stalk of the asparagus grows renew themselves every year ; the old ones die away and new ones are formed in their place which in a way perpetuate the growth of the asparagus indefinitely. Still after a certain number of years, more or less, according to the soil and the style of cultivation, the plant weakens, becomes less productive and then it must be renewed by a new sowing or by the putting down of new roots.

Sowing is done in two ways : 1. In the place where the plant is to remain, which has its advantages in many ways, were it not for the fact that the ground so occupied will give no return for two years, this method is therefore rarely followed ; 2. By sowing in nurseries, where the young plant is allowed to strengthen itself for two years ; still, however, it would be better to transplant it to its permanent bed at the end of one year, if other crops had not to be taken from the land intended for the asparagus bed.

Sowing in nurseries is done in the spring and summer in a bed composed of light sandy soil if possible, but clean and well prepared. If the soil is likely to harden, a light top-dressing of mould should be used ; in case of drought, recourse should be had to watering either before or after the sowing and the ground should be kept clear of weeds by the occasional use of the hoe.

Furrows of a good inch in depth and about 10 inches apart are made. The sowing should be very open, as the roots being always interlaced are taken up with difficulty, and besides the roots will be less strong. After the sowing the earth should be lightly covered with mould.

The young plant comes up in about 40 days and is fit for transplanting the following year.

Planting Asparagus.—The permanent planting in beds or squares is the most important operation in the cultiva-

tion of asparagus. The proceedings vary with the nature of the ground. All fertile soil, unless it contains quantities of rocks and stone, is suitable for its cultivation, even strong ground is no exception, notwithstanding the prejudice which exists against it. All that is necessary is to thoroughly loosen the soil and mix well with a large proportion of mould. As a general rule, ground intended for asparagus should be ploughed deep.

It should be broken up in the autumn to a depth of from 20 to 25 inches. All the earth should be removed, to be screened when it contains any quantity of stone ; but this screening operation is unnecessary when the earth is smooth and any stone found may be picked up by hand during the process of breaking up.

It is absolutely necessary, and a point upon which we must positively insist, that the land contain no stagnant water ; if the land is naturally dry and located in a climate not liable to an excess of moisture, draining may be dispensed with ; if the contrary is the case, a good system of drainage is the first thing to be attended to. (Fig. 27).

Besides, this drainage is a simple matter. It is done as follows : Upon the bottom of the trench, first carefully levelled, is laid a layer two inches thick of gravel or coal cinders mixed with the leaves of trees, bushes, etc. On top of this layer is placed a layer or bed of horse manure half decomposed and well packed down of one foot in thickness ; upon this second bed, place the screened earth, intended for the reception of the plants or the seed, if a nursery has not been used. This bed of earth should be 4 or 5 inches in thickness. The balance of the earth taken from the trench and which could not be used remains in ridges on both sides of the bed and is used in covering the bed again the following years as the plant acquires strength and the roots come closer and closer to the surface of the ground.

But asparagus is not always cultivated in this way ; often very much less pains are taken. Thus in certain localities, where the earth is very dry and naturally drained by the sub-soil formation, or for other causes, the digging of trenches 8 or 10 inches in depth is considered sufficient with the aid of manure mixed into the bottom by spade ; in other places they do not even take the trouble of covering in the manure. They confine themselves to a deep ploughing and

a thorough manuring ; after which the asparagus is put in ; while in still other places, the beds are to be seen more elevated than the footpaths, the latter having been lowered for the express purpose of drawing off the excess of moisture from the soil.

The methods of laying out the asparagus beds and spacing the plants, vary as do the making of the trenches or beds themselves. The beds should never be more than $1\frac{1}{2}$ yards in width so that the center of the bed may always be reached without placing the foot upon it a very essential matter during the season of cutting. Some gardeners prefer to plant in squares rather than to divide their ground into beds ; in this way they save the ground which would be taken up by the pathways, but they are liable to lose a certain quantity of asparagus trampled upon by the people doing the cutting.

In any case asparagus should be planted in rows in such a way that there will be at least 30 inches of space between the roots in every direction.

The planting of asparagus is generally done at the end of May ; great care must be taken, in removing these plants from the nursery, not to injure the roots which are very breakable and they should be as little as possible exposed to the air. The cord being fixed in position or the line traced, the position of each plant is marked at fixed distances along the line, by a small mound of earth a few inches high, upon which the root is placed, and carefully arranged along the sides ; it is then covered over with 2 or 3 inches of earth. The planting being finished, it is well to cover each bed with a top dressing of mould. Later attentions consist in watering when necessary and hoeing and weeding to destroy noxious herbs. About the middle of October the dry stalks should be cut off and removed. This should be done every year. If plants of a year old have been put down to start with, asparagus may be cut after the third growing, but it is better to wait until the following year, when the plantation, having attained its complete strength, will be in full production. From this time forward it will require nothing but hoeing, weeding and watering in summer ; in the spring and autumn it should be turned lightly with a fork, great care being taken not to disturb the roots, and once every year it should be covered with 2 or 3 inches of earth. (Care must be taken never to allow the roots to be uncovered.)

Asparagus being a very long-lived plant, and its productiveness always in proportion to the quantity of manure it receives, the land should be manured every year, solid manure should be spread in the autumn and liquid applied in the spring. The use of salt is much to be recommended, it gives the asparagus a unique flavour ; it should be dissolved in water and distributed with the watering pot. The position of each plant should be marked by a small picket, as this precaution will permit the working of the ground with greater safety.

Managed in this way, a plantation of asparagus will last in good condition for about fifteen years more or less, according to the quality of the land and the preservation of the plant.

If instead of planting asparagus as above, putting in the seed where it is to remain permanently, should be preferred, the preparation of the ground is the same, except that instead of making little mounds at the points where the plants are to be placed, small furrows should be dug, 30 inches apart in every direction in which 3 or 4 grains of seed are deposited each one inch from the other, and which should then be covered with mould. After the plants have come up and the growth is assured, the finest plant at each point is selected to remain and the others are removed. The future attention to be given them is the same, but one year longer must be waited before the produce can be cut. Everything we have said up to the present time refers to the natural cultivation of asparagus : but they may also be forced like other vegetables by means of beds and glass. Early asparagus gives large returns when grown near enough to a large town to assure a ready sale. But this system of cultivation very soon exhausts the asparagus root ; and in ordinary cases only the asparagus in beds or squares, which it is necessary to get rid of should be submitted to forced cultivation.

Collecting Asparagus. — Collecting asparagus takes place every day, even twice a day, as fast as they attain a height of 6 or 7 inches ; they should be taken up without injuring the roots or destroying the other young stalks which have not yet reached the surface. To effect this, the mound is undone or opened so as to uncover the stalk to its base ; it is detached or cut off with a small knife ; by this method

the asparagus is secured in its full length without injury to the rest, this operation finished the mound is again put together by hand.

When the gardener intends to collect his own seed for future use, the finest and best of the heads first showing above the ground are reserved. As the asparagus flowers are both male and female and as there is nothing to indicate this difference before hand, it is better rather to reserve more than less, than to run the risk of having nothing but male plants which throw no seeds. The berry (a sort of small pea) is gathered in November or at the end of October. They are allowed to soak in water for twelve or fifteen days so that the pulp may be detached from the seed which is then washed and allowed to dry in some well aired place. They retain the faculty of germination for several years. At the same time we do not recommend the collection of seed. It is better to buy it from the seedsman.

Asparagus shows, up to the present, but a small number of varieties, at least in comparison with other vegetables. However, there are two leading varieties : the asparagus of Argenteuil and the colossal of Canover. The first is the most common and requires the least care in cultivation. It is equally good, but a little smaller than the other. The white Columbia which is of a superior quality, is also worthy of notice.

THE CRIOCERIS OF THE ASPARAGUS, A DESTRUCTIVE INSECT

It is a perfect insect, blueish black, elongated, about $\frac{1}{4}$ of an inch long, marked on the back with six very distinct white spots and a red ring round the neck, it has also wings ; it appears in the spring and perforates the asparagus shoots and deposits its eggs which are of a greenish black color. The worm produced from these eggs is of a deep olive, shaped like a slug ; it also attacks the shoots.

THE REMEDY.—As it is impossible in the spring when the young asparagus shoots are being collected, to apply any poisonous substance for the destruction of the full grown insect which has wintered on the spot, the remedies must be directed chiefly against the larva which appear upon the plants in the course of the summer. There are different ways of keeping these insects in check.

1. *To powder with lime.*—Perhaps the most efficacious way of destroying these larva is by powdering the plants at short intervals, every three or four days, with lime slacked in the air, which adheres to their clammy bodies and causes the rapid destruction of all that it reaches. The best time for applying the lime is in the early morning while the dew is still upon the plants.

2. *Arsenite.*—Active poisons, such as a mixture of Paris green and flour or of Paris green and lime applied dry to the stalks when they have sprouted, in the same way as for potatoe bugs, have the desired effect and not only kill the larva by contact, but also the full grown insect which feeds upon the poisoned foliage. But in such case the asparagus cannot be eaten.

3. *By beating.*—The full grown insect and a large number of the larva may be made to fall into nets or vessels filled with a mixture of water and coal oil by beating the asparagus plants.

CHAPTER FOUR

Roots.—Carrots, Turnips, Salsify, Radishes, Parsnips, Potatoes, Beet-root, &c.—Cultivation.

CARROTS.—The garden carrot, through its excellence, properly takes first place among roots.

Its varieties are easily changed and of these there are a great number all more or less valuable for their various qualities. We will only refer to those which seem to succeed best in our climate.

THE RED DANVERS.—A valuable american variety. Its shape, its color and its many good qualities always obtain for it a ready sale on the market.

It is also one of the best varieties for cultivation on the farm (Fig. 28)

THE EARLY HORN.—The root is about twice as long as large, considerably larger at the top, than at the lower end which is generally blunt. It is the earliest variety grown in open ground.

THE OX-HEART OR GUERANDE. — A distinct variety— noted as well for its large size, as for the rapidity of its growth ; the flesh is tender and delicate and deep red in color.



Fig 28 — Red Danvers — Carrot.

THE NANTES. — An almost perfectly round root, a little larger at the top, the lower end being blunt or even round, the skin smooth, the flesh perfectly red almost to the heart ; smooth and sweet tasting. It is an excellent table variety.

CHANTENAIS. — A good table variety, differing from the Nantes in that the top of its root is larger.

CARENTAN. — The half long carrot of Carentan somewhat resembles the Nantes, but still differs from it by the smallness of its root, perfectly round in shape, red in color and also in the growth of the leaves. Sown thick in good loose well manured ground, it will yield a good crop.

THE AMSTERDAM. — A straight root, very smooth, of medium size, tapering down to a point : skin of a bright red color ; the flesh red, sweet and tender to the center. — (Fig. 29).

Whatever the qualities of the various varieties of carrots, they are all greatly affected by the nature of the soil. In poor, dry badly cultivated ground, all carrots will degenerate and become similar to the wild carrot; clean smooth ground, or a sandy soil but rich and deep are the most suitable for the growth of carrots. It does not require fresh manuring. A manuring done a year or at least five or six months before the sowing is always preferable to one of more recent date.



Ground intended for the sowing of carrots should therefore be well loosened, especially if the carrots be of a long variety; the ploughing should be deep. Sowing is done broadcast, sometimes in rows 6 or 8 inches apart, the seed is covered over with a rake; but in strong ground it is better to cover with top dressing of mould. After they have come up, carrots require a great deal of attention. A part of the seed almost always fails to come up and the sowing becomes uneven. This is corrected by putting down in the vacant places, plants taken from places where the sowing has come up too thick. While transplanting, care must be taken not to break or bend the roots. In addition to these precautions, the

Fig 29 The Amsterdam Carrot and watered as often as required. These operations are indispensable.

The time for sowing varies according to the time when it is intended to take in the crop. As a general rule the sowing takes place in May and June and the crop ripens during the summer.

Carrots sown in the spring sometimes run quickly to seed, their roots then become stringy and good for nothing. They must therefore be used before reaching this stage. To obtain seed, carrots of the preceding year, which have wintered in the cellar, are planted in the spring.

B. TURNIPS.—In turnips, as well as carrots, cultivation has produced an immense number of varieties, but most of which, however, are only cultivated in the localities where they were formed. There are not more than six or seven varieties which have entirely preserved their characteristics; they are the long white turnip, the pink turnip of the Palatinate, the gray of Marigny, the yellow Dutch, the long yellow of the United States, and the turnip or radish of Limousin. The large varieties are very much cultivated by farmers who use them as cattle feed. Gardeners prefer those of more delicate and agreeable taste. The Jersey lily, the white Milan and the snow ball are deservedly highly thought of.

THE JERSEY LILY is a fairly early variety, clean and smooth in appearance.

The Ovoide with an egg-shaped root, about one third longer than large, has firm white flesh and is of superior quality.

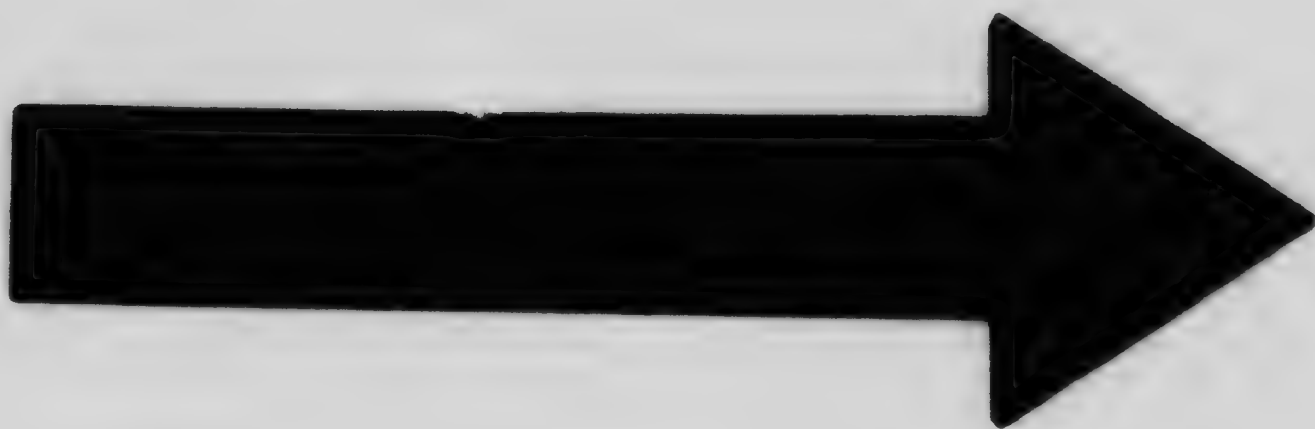
THE SNOW-BALL is an early turnip, round, white and sweet tasting and is highly thought of on account of its rapidity of growth and its fine shape.

THE WHITE MILAN.—The sub-joined cut (Fig. 30) shows a Milan turnip six weeks after sowing. Of even and regular form, with delicious and tender flesh, it grows so rapidly that it is almost without peel. It ripens earlier than all other kinds and as an early variety it is the favorite on the market.

As early turnips grow fast, they should only be sown in small quantities at a time as they rapidly run to seed.

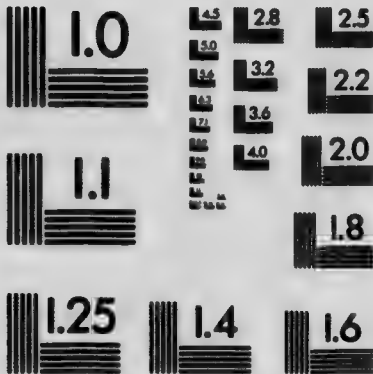
Whatever the variety or the kind of turnip, the cultivation is very simple and easy, as they are hardy and vigorous, they require very little handling and grow almost everywhere, except in strong ground.

Sowing is usually done from the end of May to the month of July, it is always done broad cast in fresh broken ground. Subsequent work consists of thinning and weeding. Turnips are pulled and put into the cellar before the frost,



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where they keep well, unless the cellars be too damp. They are used during the winter. Turnips which have been thus kept sheltered from the frost over the winter may be planted in the spring for the production of seed. They go to seed at once and their roots become stringy.



Fig. 30—White Milan Turnip.

RADISHES.—The radish is an annual plant said to have come originally from China. There are more than forty known varieties, the principal of which are, the early white radish, the ordinary white, the early pink, the half long pink and the long scarlet radish the roots of which are fit to eat 25 days after they have been sown, and the flesh of which is tender and of superior quality.

Radishes will grow in almost any soil ; but a firm ground rather cold is the most suitable. When the seed is sown in light ground, it should always be well stamped down before putting in the seed, which should then be lightly covered over. Perhaps it might be better only to perform this opera-

tion after the sowing and then cover over lightly with the rake. Radishes should be sown from the first fine weather every eight days so as to have some always ready for use ; those sown in summer should be put into moist shady ground. Watering is done the more frequently in proportion as the soil is light and evaporates the water it receives. A few days are enough for the growth of the radish which gathered late becomes hollow and loses its qualities.

SALSIFY, SCORSONERA.—The Salsify is a plant which is cultivated for its root, which is shaped like a carrot very long and thin.

It is sown in the spring in rows 8 inches apart. When the plants have grown 3 or 4 inches, thin them to 4 inches. After the beginning of October they will be fit for the table. They may be kept in the cellar for the winter, but they must be covered with sand. They may be also left in the ground for the winter.

Salsify are prepared either with a white sauce or they may be fried.

SCORSONERA.—The scorsonera, like the salsify, is cultivated for its root ; it is larger, more tender and sweeter than that of the salsify : although it has a black skin the flesh is very white. It may be eaten boiled like the carrot or fried like the salsify. It differs from the latter in that its root is better after the second year. It requires the same cultivation.

The seed of the salsify and the scorsonera rarely keep more than two years

Salsify requires a rich soil, ploughed deep, well broken up and not recently manured. Watering is necessary, if the weather is very dry, until the gathering of the roots, which takes place in the autumn.

PARSNIPS.—The parsnip is another plant of the same family as the carrot, which it resembles in some respects. Its root is fairly long, generally white, sweet and aromatic. It is not much used for domestic consumption ; is seldom used except to give a flavor to soups.

The principal varieties are :

The long hollow crowned, very long and white, smooth, tender and very sweet.

The round parsnip, with a short root, rounded like a top ; It is a quick grower and does very well in land of no great depth. The long parsnip of the island of Guernesey, on the contrary attains large proportions. This third variety, like the first, requires a deep soil, dug deep and well broken up and manured. They all succeed better in a cold and slightly humid soil than they do in dryer land.

As the seed does not germinate easily, it must be sown very early half an inch in depth, and later on weeded and thinned in the same way as carrots.

THE POTATOE.—Although the importance of the potatoe as an article of food for the people would point it out for farm cultivation rather than for that of the garden, still it must not be forgotten that every person has not large pieces of ground at his disposal and that the settler who is clearing his land, the villager and the resident of the neighbourhood of towns, can count on nothing larger than a garden. For this reason we cannot pass over this important vegetable in the present treatise.

Potatoes should be planted in rows at least two feet apart and with a space of one foot between them. Every piece planted should have at least three eyes. In planting, that is to say, planting at a depth of 6 or 7 inches seems to have been given up at the present day—on this point the best we can do is to refer the reader to the results of experiments at the Ottawa experimental farm and which appear conclusive. The Horticulturist in his report of 1900, says :

Potatoes planted at different depths.—During the past three years we have tried the planting of potatoes at different depths in rows $2\frac{1}{2}$ feet apart with a space of 12 inches between the plants ; each piece planted had at least 3 eyes. The planting each of the three years was in sandy soil. Flat cultivation was the system adopted ; therefore very little earth was put over the potatoes after they were covered at the time of planting. The following table shows that the best returns were obtained from cuttings planted at a depth of only one inch.

We noted the depth at which the tubers were formed in 1899 and 1900 and we found that most of them were 4 inches from the surface of the ground, even when the cuttings had been planted at a depth of 6, 7 and 8 inches.

Where the cuttings had been planted at a depth of less than 4 inches, almost all the tubers had been formed between that depth and the surface of the ground.

This year two varieties of potatoes were used for this experiment: the Walter Raleigh and Empire State, and we give the average results as the returns for 1900.

There are many reasons why potatoes planted at a depth of from 1 to 3 inches should give the best results. Potatoes grow more rapidly in a warm than in a cold soil, and within the first 3 or 4 inches from the surface, the earth is warmer than 3 or 4 inches lower down, consequently the conditions are more favorable to the potatoe.

On the other hand the success of planting at a small depth, depends very much upon the moisture of the ground. During a very dry season the two first inches of soil might be so dry that the potatoe could not readily put out its root and the growing season would thus be shortened.

From the results obtained it seems reasonable to conclude that where the ground is not dry the best results will be obtained by planting at a small depth.

In localities where the spring is late or where the ground is cold, it would perhaps be better to plant at a small depth.

Although in sandy soil, we have obtained the best returns by planting the cuttings one inch in depth, still we would not recommend this to be done in field cultivation, unless the surface of the ground was kept loose and free from weeds, the crop of potatoes would not be large. Before the plants have come up or when they are just showing above the ground, the field should be harrowed once or twice to destroy the greater part of the weeds. If the cuttings are only an inch down and the earth is harrowed a great number of them will be uncovered. For this reason it is better to plant at a depth of 4 inches.

Potatoes planted at a depth of	Returns per acre.		Average return per acre.
	1899	1900	1898-1900
	bushels	bushels	bushels.
1 inch.....	532	468	449
2 inches	469	462	358
3 "	493	422	399
4 "	520	404	400
5 "	474	334	366
6 "	421	367	350
7 "	392	336	339
8 "	353	345	321

" The ground must be kept perfectly clear of weeds and the plants must be earthed up at least once, sometimes twice, especially if the planting has been shallow."

Potatoes are gathered in the Autumn. They must be allowed to dry a little before being put into the cellar; the cellar should be dry, cool and well protected from frost. If very wet when taken in, potatoes are liable at once to heat, spoil and decay.

There are large numbers of varieties of potatoes cultivated by farmers and their numbers increase every year. The following are particularly to be recommended: The Garnet Chili, the Climax, the late Rose, the Compton's Surprise, etc.

As for garden cultivation the earlier varieties are always preferred. We recommend the following: Early Rose, King of the Earlies, Extra Early, Mi Sais n, and the American Wonder.

The Potatoe bug, which comes to us from the west, is an insect which devours the leaves and stalks and causes havoc in the potatoe fields.

It is difficult to get hold of the perfect insect or of its eggs, but the larva are easily destroyed, either by having them collected and killed by women and children, or, a

quicker way, by poison. After many trials of various insecticides, arsenic of copper, or Paris green is recognized as the best and giving the best results. This salt, which is insoluble in water, is used in a powdered state, but to facilitate its distribution, it is mixed with water, in the proportion of a quarter of a pound to 25 gallons of water.

The mixture must be kept constantly stirred, so that the arseniate may be kept in suspension in the liquid and it is sprinkled over the plants from a watering pot, a garden syringe, or a hand pump.

BEETS.—These plants which occupy such a prominent place in farming, have also their uses as a direct food for man and consequently are included in the list of garden vegetables. The beet requires a rich deep soil, rather light than strong. The land should be manured the year before the sowing, for if manure is used at the time of sowing, the roots will become twisted and split and will not grow to the same extent. The long roots especially require a soil as homogeneous as possible that they may continue their growth to their full size without dividing into smaller roots.



Fig. 31—Round Beets.

If it is desired to hasten the sprouting of the seed, it should be soaked in tepid water for 24 hours. Sow during

the month of May in rows 15 to 18 inches apart. When the plant is 2 or 3 inches high, thin so as to leave a space of 6 or 8 inches between each root. Keep the ground clear of weeds between the rows and loosen, frequently around the roots until the leaves completely cover the whole ground.

BEETS.—Like parsnips, carrots and turn'ps, do not require earthing up like potatoes, but for their well being, the earth between the rows should often be lightly dug with an iron fork. This tillage greatly assists the growth of the root by destroying the compactness of the ground and by permitting the heat and moisture to penetrate.

To keep beets for the winter they must be covered in the cellar with light sand.

The less the air where they are kept is changed the less chance there is of their rotting or sprouting which makes them taste bad.

Any loss from this cause may be avoided, especially if they are covered with sand, by cutting them off at the neck ; the cut soon dries up and the root retains its freshness. There are many varieties of beets ;—the following are the best.

The Orange of medium length, with yellow flesh, tender and juicy ; the Long Red, of good size, flesh a deep red ; the Columbia, red, round and quick growing ; the red beet of Castelnauary, &c.

CHAPTER FIVE

Fruit and Seed Plants — Peas, Haricots, Beans, &c. — Plants With Eatable Fruit — Pumpkins, Gourds, Cucumbers, Gherkins, Tomatas, Strawberries, Melons, &c. — Their Cultivation, &c.

A. PEAS.—This excellent vegetable, through cultivation has given us an immense number of varieties, of which we will only refer to the principal. They are divided into two groups, the one having a tough membrane as an inside lining to the pod and the other without it. From this division comes the names shelled peas, meaning those of which only the seed is eaten, and the eatable podded comprising the varieties, the green pod of which is tender all through and which is eaten green with the peas inside.

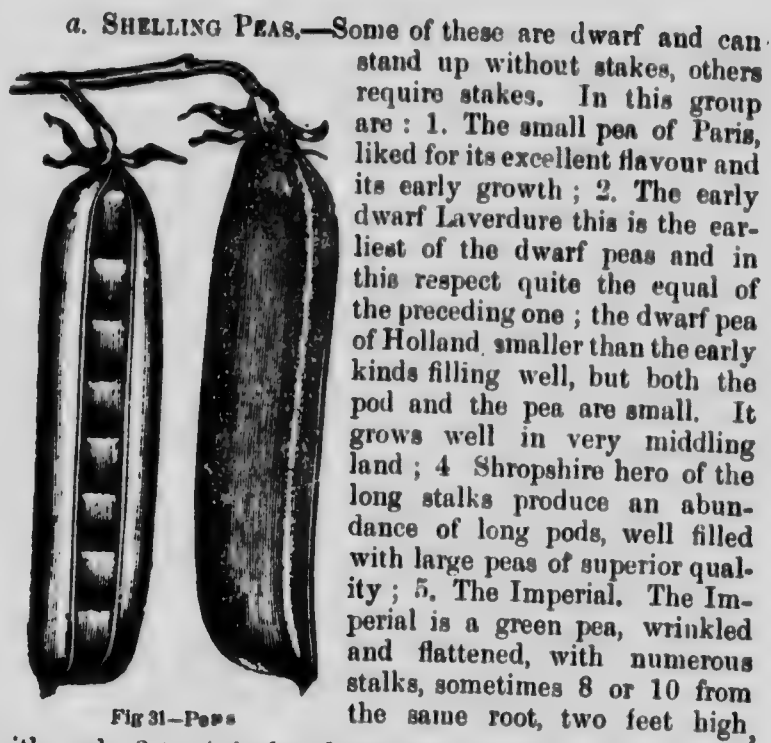


FIG 31—Peas

a. **SHELLING PEAS.**—Some of these are dwarf and can stand up without stakes, others require stakes. In this group are : 1. The small pea of Paris, liked for its excellent flavour and its early growth ; 2. The early dwarf Laverdure this is the earliest of the dwarf peas and in this respect quite the equal of the preceding one ; the dwarf pea of Holland, smaller than the early kinds filling well, but both the pod and the pea are small. It grows well in very middling land ; 4 Shropshire hero of the long stalks produce an abundance of long pods, well filled with large peas of superior quality ; 5. The Imperial. The Imperial is a green pea, wrinkled and flattened, with numerous stalks, sometimes 8 or 10 from the same root, two feet high, with pods 3 to 4 inches long, large peas and of superior quality. The Favorite of the market, this pea has been viewed with the approval wherever it has been cultivated, both on account of its fine flavour and large production, stalks two feet high, growing regularly and evenly ; the pods of a medium size, filled with a wrinkled pea of a delicious flavour.

b. **Eatable podded peas.**—There is little difference between all these varieties in the quality of the produce, but there are some early and some late producers ; in this group we will specially mention ; 1. The eatable podded or fan pea, is the only one in this division which is a true dwarf ; 2. The large eatable podded pea is shaped like a ram's horn and is perhaps the best of its class, with broad large and bent pods, it is a late pea and very productive in good ground. 3. The half dwarf variety is also very productive and a little earlier than the preceding. Peas of all varieties are grown upon almost any kind of ground, they do better however in a sound.

light soil ; but they do best of all in new land or at least in land in which peas have not been grown for many years. They are sown in hillocks or furrows as the ground is dry or wet, often in borders along walls with a southern exposure, when early peas are desired. The furrows are dug 7 or 8 inches from one another, but a little more space is left when they are sown in hillocks. In the latter case the holes should be dug 10 or 11 inches from one another and five or six seeds planted in each.

Peas do not require manure. Wood ashes are the only thing that helps them, and assists their production to a remarkable extent ; with ordinary manuring they would grow quantities of leaves and stalks but would give small returns of the peas themselves. (Fig. 32).

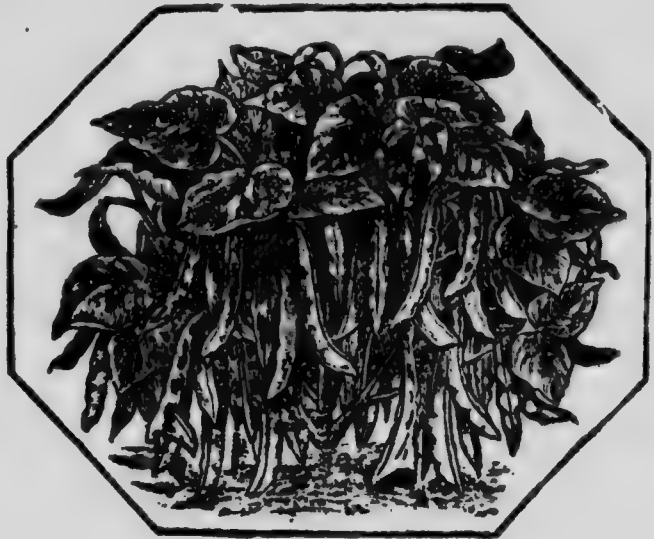


Fig. 32.—Haricots.

Peas are an important article in farm cultivation.

B. HARICOTS BEANS.—No vegetable perhaps has produced more varieties through cultivation. All are not equally valuable for cultivation and their quality often depends on the nature of the soil. It is therefore not at all unusual to

see a species of haricot deservedly highly thought of in one locality, degenerate when cultivated in an other. (Fig. 33).



Fig. 33 — Haricots, black sword.

The varieties of haricots are divided into two principal groups, according to their manner of growth. Some send out numbers of stalks, of greater or lesser length, which must be supported with stakes; others remain short or low and support themselves. There are however a small number which appear to be, between the two main divisions. Finally, as in the pea, there are haricots which are entirely unprovided with the inside membrane, almost until their complete maturity.

The following varieties deserve special mention.

Boston Favorite.—A green haricot, with a long pod and very productive.

Early Giant Wax.—Yellow seed, long pods, very productive. A fine variety in every respect.

Canadian Wonder.—Undoubtedly an excellent variety with many long yellow pods, of very fine flavour.

Mohawk.—A long, flat, straight, green pod, very productive.

Giant Yosemite Wax.—Large yellow pod of excellent flavour. Very productive.

Nettle Leafed Bagnolet.—Long, straight, green pod. Very productive.

Scarlet Flageolet Wax.—Properly much sought after. The pods are large, of a deep yellow and produced in abundance.

The Dwarf Sword has very long pods ; it shares the qualities of the tall haricot, but it has the disadvantage of allowing its pods to rest upon the ground, which causes them to rot when there is a slight moisture. This variety should only be sown in a very sound, rather dry soil ; with that exception it is an excellent variety ; the white American dwarf, a large spreading plant, very productive ; its pod is without membrane, its seed small and white and very good when dried. Only two or three seed should be put in each hillock on account of the way in which the plant spreads ; the black haricot of Belgium, the earliest of all haricots, the green pods of which are esteemed above all others (Fig. 34).

A smooth light and cold soil is the most suitable for this vegetable, but they also grow well in strong compact ground provided it has been well broken up and loosened. The haricot differs from the pea in that it is benefited by manure, the best is horse or cow manure ; wood ashes are equally good.

Haricots being sensitive and liable to suffer from cold, as stated already, their sowing in the ground should not be commenced until the latest spring frosts are over. The best time is the end of May. The time of sowing varies according as the crop is to be gathered green or dry ; in the latter case, the sowing should not be later than the 15th of June for the late varieties ; after the 8th of July for the early. If sown later the seed will not have time to ripen before the first frost. When it is intended to pick green, the sowing may be continued during the month of July.

In light ground and especially in a dry climate the sowing should be in hillocks to shade the roots and hold the moisture ; in strong ground the sowing should be done in rows, one seed at a time, about 3 inches apart, with a space

of one foot between the rows. When sown in hillocks, not more than 5 or 6 seeds should be put into each hole ; when the seed has come up, the ground should be hoed at least a couple of times, the first time to break up the surface and



Fig. 31—Haricot Butter-Bean.

the second time to slightly earth up the roots. All work in haricot beds should be avoided, while the leaves are wet, as they would be liable to rust, which would be most injurious to the plant.

The cultivation of haricots is easy and requires few details here.

When picking green haricots, certain precautions must be taken, which it is well to point out. The flowers of the haricot are loosely attached to the plant, and the least shaking often causes them to fall off. Therefore all rough shaking or handling of the plants while in flower, must be avoided; the haricot must be removed one by one by cutting the tails with the thumb nail, otherwise the crop may be found to have decreased by half.

Tall haricots require stakes: These consist of rods from $1\frac{1}{2}$ to $2\frac{1}{2}$ yards in length, according to the kind of plant: these rods are pointed at the large end to be sunk into the ground at each hillock or from space to space if the haricots have been sown in rows.

As we have stated above, the dwarf haricot may be forced in beds and under glass at the end of the winter; but this expensive cultivation can only be carried on in the neighbourhood of large cities where the sale of the produce is assured; under these circumstances they will yield handsome profits.

C. BEANS.—Beans are not largely cultivated in this country. Almost the only variety grown is that known as the garden bean. Still there are other better varieties, such as the Portuguese bean, which is the earliest of all and the best as a vegetable; and the Broad Windsor bean distinguished by the length of its pods and a third more productive than the garden bean.

Beans, of every variety, require plenty of room to produce abundantly. They are sown at the end of May in furrows or hillocks; in the latter case only 3 or 4 beans are put into each hole; the holes about 1 foot apart. The furrows should be separated from one another by a similar distance. Beans should be hoed twice during their period of growth and they should be earthed up, which strengthens the plant and makes it yield more abundantly. When the flowers are over, the ends of the branches and stalk, should be nipped to stop the sap and send it to the fruit. In some localities beans are used to make coffee either alone or mixed with coffee.

D. PUMPKINS, GOURDS.—Under these two names are known a great number of annual plants, natives of very hot

climates and belonging probably to many distinct species ; but cultivation has given birth to such a number of varieties, it has effected so many crosses between different races, that to-day it is difficult to recognize the original plant from which these varieties have been derived.

Pumpkins are generally round, while gourds are generally distinguished by their odd or singular shapes. They often derive their names from this peculiarity. Thus there are Turk's caps, yellow and white with a border shaped like a coronet; the bottle shaped with a crook-neck ; the crook-necked squash of Canada, the Yokohama, of Japan, highly thought of. We would also refer to the Caramel (Fig. 35) which has a bright yellow peel, with flesh dry and sweet. In a dry cool place they be kept in good order until the spring. It is a good and good looking winter gourd for family use and also for the market. The principal varieties of the pumpkin are the Boulogne, the Belgian Queen, the yellow of Canada and the Spanish pumpkin.



Fig. 3.—The Caramel Gourd

The cultivation of gourds and pumpkins of all varieties is the most simple form of gardening. It is always successful, providing there is manure heat and as much water as is wanted. They might be sown in beds, so as to hasten the growth, but they are generally sown in trenches 1½ feet in

diameter by 12 inches in depth, the bottom of which is filled with 8 inches of good manure closely packed and covered with 2 or 3 inches of mould. In each trench two or three seeds are sown and when they have come up, only the most vigorous plant is allowed to grow. When the plant has thrown out two or three leaves, the stalk should be nipped so as to cause it to spread. The holes must be spaced from each other in proportion to the growth of the stalks and they must be frequently watered during their whole period of vegetation. They should be sown permanently at the end of May. This may be done a little earlier by sowing in beds or under glass, so that the young plants may be put out as soon as there is nothing to be feared from frost. (Fig. 36).



Fig. 36—Yellow Pumpkin of Canada.

CUCUMBERS, GHERKINS.—There are about ten varieties, among the best of which are :

The early Holland, white at first, turning yellow when becoming ripe.

The small green cucumber or Gherkin, which is little used except for preserving in vinegar.

The Canadian.—A strong and productive variety, of medium size, straight, round, of bright green color ; delicious flesh.

The long green English—(Fig. 37) long fruit, dark green, of superior quality, very much cultivated by gardeners.

The young fruit of all these kinds of cucumbers may be gathered when as big as the little finger, to be preserved in vinegar, when they become what we call gherkins; still it is the small green cucumber which is specially reserved for this purpose; the others are gathered when they have attained their full size.



Fig. 37.—The Long Green English.

The cultivation of cucumbers is very similar to that of gourds, still as they do not grow so large, they are sown more closely together. Whatever variety is cultivated, they should not be risked in the open air so long as frost is to be feared. For cultivation in the open ground, they are sown at the end of May or in the first week in June, in light rich ground, well exposed to the sun; and there must be no stint of watering. The parent stem must be stopped after the appearance of the 4th leaf and the other stems at the third or fourth leaf after fruit is formed.

The seed, which will keep for several years is obtained by allowing some of the choice fruit to dry.

THE MELON.—The flavour and odour of this fruit has caused it to be sought after and cultivated from time immemorial in almost every portion of the globe. The varieties have been increased to such a degree that at the present time, the greater number of them are no longer distinct.

Besides it is a fruit which rarely reaches its full growth in our climate. Still with a great deal of care a very fine product may be obtained. (Fig. 38).



Fig. 38.—The Nutmeg Melon of Montreal

They are sown in beds in the beginning of May in small pots, so as to be able the more easily to transplant them with the clod or ball of earth adhering to the roots from which they must not be separated during the operation. Birch bark may be used instead of the pots, the bottom of the bark must be covered with a flat stone or a piece of glass in the same way as the pots to facilitate the unpotting.

The pots are sunk in the hot-bed.

Transplanting takes place into deep beds about the middle of June when frost is no longer to be feared. These beds are formed of a mixture of horse and cow dung covered with 5 or 6 inches of good ground. Giving less heat than the hot-bed, the deep bed will nevertheless not fail to quicken vegetation at that advanced season of the year especially if it has a good exposure. A light watering should be

given to attach the clod to the ground, the glass is then put on and no air given for some days. The glass should also be shaded either by covering with a handful of litter or by spreading mats over them during the heat of the sun, and this care is particularly necessary for plants, the clods of which have been more or less injured.

When it is certain that the plant has again taken root, air and light are given it but only gradually, by slightly raising the glass. As the melons begin to grow and the weather becomes warmer, the glass is raised still more, and finally removed altogether and replaced in the store-room. Some gardeners however keep the glass frames almost to the end over the plants to protect them from moisture. This care is very useful and sometimes indispensable in rainy years to preserve the melons from canker a sort of decay to which they are very liable in our rigorous climate.

The Dressing of the Melon.—This is a most important operation. Melons left to themselves do not spread much. The principal stalk lengthens considerably before showing any fruit and setting a few buds. On the contrary dressing or pruning stops it short, the sap is carried to the buds which are found in the axil of each leaf and causes them to throw out lateral branches which spread equally on all sides of the bed, the space is better filled and fruiting is more rapid and abundant.

To top the melon, one should wait until the growth of the fourth leaf, without counting the cotyledon or seed leaves, which should in no case be removed. The operation is performed by nipping the stalk with the thumb nail above the second leaf, taking care to spare the buds which sprout from the axils of those allowed to remain. The cut is covered with a small quantity of dry pulverized earth to prevent the loss of the sap. Very soon the buds grow and form two branches which spread over the ground in opposite directions; sometimes even a third and a fourth is added which start from the axils of the seed leaves.

When these branches have produced their second leaf, they are topped in their turn and in the same way, which forces each of them to subdivide into two new branches which it is useless to prune thereafter. After reaching this point, melons soon show their first flowers. Similar to most plants of the same family, melons are unisexual, that is to

say they are either male or female. Gardeners give the name of false flowers to the male flowers which are sterile and that of maille to the female flowers which may be recognized by the rudimental fruit around them. Although the male flowers produce no fruit and they fall after blossoming, their presence is indispensable to the growth of the fruit adhering to the female flowers which they impregnate by the emission of their pollen.

Notwithstanding every care, there are never many fruit form on the same vine, and this is well, because each plant having only a fixed quantity of sap to furnish, the fruit benefit the more, the less there are of them. Many gardeners are satisfied with two or three melons to each plant; there are even some who in order to have them finer, will only preserve one.

In a general way, every melon is looked upon as knotted or set, when having attained the size of a hen's egg it retains its healthy appearance. If the plantation is properly managed, the melon grows rapidly and reaches maturity after forty or fifty days, more or less, according to the heat of the summer or climate, or again, according to the variety of melon. In cold or rainy countries, it is customary to lift the half or three-quarter grown melons so as to place under them a stone or board to separate them from the soil, the moisture from which might cause their destruction. It is also advisable to turn them now and then so that each side will receive an equal amount of sun and their growth go on more regularly. Should this not be done, the side which has been in continual contact with the ground will be far inferior in quality to the opposite side. When the melons have almost reached their full size, the fruit is so placed as to be as much as possible exposed to the rays of the sun, and to effect this it is often necessary to break off some leaves or at least to separate them so that they will not throw shade over the fruit.

The signs which indicate that a melon is ready for cutting vary according to the variety; and are sometimes hard enough to recognize. Ribbed melons and cantaloups have reached maturity when they give off that agreeable odour which every person knows and which, especially in the ribbed species, is accompanied by a marked yellowish tint between the ribs.

Melons suffer from dampness, therefore watering must be done very sparingly. The leaves may be sprinkled from time to time with a watering pot, the rose of which must be pierced with small holes so as to produce the effect of a fine rain.

Melon seed should be collected from the very finest specimens which have reached perfect maturity and selected as well as possible from those showing in the highest degree the characteristics of their variety. The seed should be spread out on a board and dried in the sun, and should not be washed. When perfectly dry, it is put into paper bags and stored in a dry place. This seed will keep good for years.

A great number of varieties are grown, some with green flesh and some with yellow. The first are generally the sweeter and more juicy.

The following are considered the best varieties :

Green.—The Green Citron, the Nutmeg of Montreal, the Brodé of Skillman, &c.

Yellow.—The Cantaloups, the Ananas, the large Musk Melon, &c.

Water Melon.—Water Melons or Pastèques require more care than ordinary melons. They are sown in pots in beds to be afterwards reset on small mounds, formed of a foundation of fresh manure, which is covered with strongly manured mold. They are dressed or pruned in the same way as melons. The following varieties are looked upon as the best : the Black Spanish, red flesh with black seeds ; the Gipsej, red flesh with black seeds ; the Phinney, red flesh, &c.

There are a great variety of water melons, much less delicate than the preceding. They are called Citronelles, they make good preserves, but cannot be eaten raw ; they have white flesh with reddish seeds.

TOMATAS.—The cultivation of tomatas, almost abandoned some years ago, has taken a fresh start of late years, and seems now to be increasing.

To-day the consumption of tomatas is enormous, either fresh, or preserved and the individual who looked upon the

tomata as an object of curiosity under the name of the love apple, is now well pleased to enjoy its flavour. (Fig. 39).



Fig. 39—Tomata.

The Cultivation of the Tomata.—Although every person likes tomatas, it cannot be said that every body can grow them. The tomata although of the same family as the potatoe is more delicate and less hardy than the latter. In the whole Province of Quebec it must be started in hot beds in the spring.

The seed is sown at the end of March, the plants are reset in other hot-beds, when they have four leaves and a second time when they have seven leaves, if they are expected to come on fast and strong. They are transplanted into the open ground about the end of May. There should be a space of three feet all round between the plants.

When the plant is young in the open ground, frost as well as the too powerful rays of the sun are dangerous; it should therefore be protected for some days.

For growing tomatas the ground should be well prepared and manured.

When they have reached a certain height, the plants should be tied to stakes as a protection against the wind. Later on these stakes will assist them in supporting their fruit and prevent it from lying on the ground.

In view of the shortness of the summer too much must not be expected from each plant, and the more fruit there is, the longer it will take to reach the ordinary size. Two other stems with the parent stalk are enough to allow to grow.

As soon as there are a dozen or more tomatoes well formed, other shoots from the stem should be removed and the latter itself should have the top cut off.

Again on account of the rigor of our climate the growing must be hastened as much as possible, if fruit is expected before the Autumn frosts.

For this reason also when the tomato has attained its full growth, some of the leaves should be taken off to allow the sun's rays the better to reach the fruit. It is difficult to state precisely the number of plants required to satisfy the needs of a family, but about fifty at 10 tomatoes to a plant, should give a yield which ought to be sufficient for most ordinary families.

As to the tomatoes which have not ripened in the open air before the frost, they may be picked and put into a warm place, where they will soon ripen of themselves.

Choice of Varieties.—(One of the principal elements of success is the choice of the most productive and early varieties. From experiment and results obtained, the following should be chosen :

Conqueror, Dwarf Champion, Canada Victor and Early Ruby.

If any one wishes to collect his own tomato seed, he must take great care to take it only from tomatoes that were perfectly sound at the time they were pulled. The seed should be cleaned and dried and put away in a dry place.

STRAWBERRIES.—Strawberries require ground which has been well prepared and broken up, rather sandy than containing clay. Their enormous fertility renders their cultivation most profitable in the neighbourhood of large towns. With proper care 250 to 300 bushels can easily be got from an acre.

In cultivation strawberries are divided into two classes; that is: those with perfect flowers, having both male and female; and those with imperfect flowers, that is to say, where the male flower is on one plant and the female on another. To obtain fruit from the latter class the male and

female plants must necessarily be mixed, otherwise they would continue sterile for ever. The class with perfect flowers are the best for cultivation.

REPRODUCTION OF STRAWBERRIES

The strawberry reproduces or increases in three ways, namely: by sowing, by the dividing of the roots and by runners (stolons) which take root of themselves while lying on the ground.

Sowing is had recourse to generally for the sole purpose of obtaining new varieties. Dividing the roots is rarely done, unless it be for some kinds that have become destitute of runners. The surest way for the increase of the strawberry plant is by rooting runners.

The increase by shoots is the way most generally followed for the multiplication of the strawberry plant. So long as the plantation does not require renewing, the runners are destroyed as fast as they are produced. But if they are required, they are allowed to take root after the month of August; a month or six weeks after, the plant growing from the runner is fit to take up and plant elsewhere. Strawberries are put down in beds or borders.

The piece of ground intended for a strawberry plantation should be prepared about fifteen days in advance by being thoroughly dug up and manured abundantly with horse manure half decomposed. The beds should be four feet wide. Broader beds are not desirable, as when the picking is going on, the middle of the beds could not be reached by the hand without putting one foot on the bed, by which some of the plants and fruit might be destroyed.

The spring and autumn are the proper seasons for the planting of strawberries, the plants take equally well in either season. As far as possible the planting should be done in mild and somewhat damp weather, the plants should be put down immediately after being pulled up, without giving the roots time to wither through exposure to the air. They should be set in rows varying in distance from one another from 15 to 18 inches according to the growth of the different varieties and should be at equal distances from one another.

A thorough watering will attach the plant to the soil. In autumn planting, some plants are unavoidably lost during

the winter; these must be replaced in the spring. The care to be given during the first season consists of weeding, hoeing, the necessary watering and the keeping down of runners. In the spring of the second year after having removed the dead leaves and runners, there should be a light digging, mould should be added with straw on top. As described above the necessary care consists in hoeing, weeding, watering and removal of runners at least up to the month of August. After that date, the runners are allowed to increase if they are wanted for a new planting in October. As most strawberry plants give large returns only during the 2nd and 3rd years it is well to renew the plantations at the end of that time.

With a new plantation every three years, an abundant crop of fine good fruit is always assured. If it is impossible or undesirable to renew the plantations every three years. They should be earthed up from time to time, that is a little good soil should be placed around their roots. This will cause them to grow new roots above the old ones which will keep up their strength and fertility.

Strawberry plants, left to themselves soon after planting, will give an abundant crop the following year, but it will end there, the runners which will lengthen and take root, will soon have taken possession of the whole of the ground and the bed will then show nothing but a thick carpeting of verdure, in which only a few miserable specimens of fruit will be found. Some horticulturists are in the habit of putting down in the spring, between the rows of strawberry plants, a light bed or dressing of straw to prevent the earth, disturbed by heavy rain storms, from splashing over the fruit and dirtying it. This proceeding has the further advantage of preserving the freshness in the soil during the long dry seasons. But, as in some years this straw might retain too much moisture, it is preferable only to surround each plant with straw, leaving the ground bare between the rows.

Gardeners are in the habit of replacing the parent plants by new ones after each second or third crop; but in that case, in order to have fruit every year, the fields, which are to be thus renewed, must be made to alternate, because, as already stated, the first crop of a plantation amounts to little or nothing. But plants, properly looked after, being capable of producing abundantly for 7 or 8 years it is better to give

them this care than to be obliged to renew the plantation so often. In picking strawberries, the fruit should always be taken with the tail which is often joined with others on the same sprig. If the strawberry be picked without at the same time removing the tail, which is done by many persons to save themselves the trouble of pulling off the ends ; this tail or foot stalk in drying up would cause the death of a considerable number of flowers or fruit. Gardeners who have knowledge of these details, in picking their fruit, never fail to cut off the tail with each fruit which is cleverly done with the thumb nail without disturbing or shaking the plant.



Fig. 40.—Strawberries:

The best varieties of strawberries are :

1. THE BOSTON PINE.—Large, with red flesh, good, hardy and very productive (Fig. 40).
2. THE BRIGHTON PINE.—Medium size, productive and excellent.
3. THE DUKE OF BRABANT.—Large, long, cone shaped, very early and good.
5. THE HONOUR OF BELGIUM. — Very large, oblong, superb in appearance, good and productive.
6. THE HOOKER.—Large, deep red, fine flavour, and productive.

7. **THE JUGUNDA.**—Very large, conical, flesh white, juicy and fine flavoured. One of the most profitable for the market ; succeeds well in strong ground.

8. **THE QUEEN.**—Very large, deep red, fine and good. A French variety.

9. **THE LARGE EARLY SCARLET.**—One of the oldest varieties, at the same time highly thought of, on account of its hardy nature, its early ripening and fertility ; slightly acid and of a light colour.

BLIGHT AND INSECT PREVENTATIVES

Beside the damage caused by weeds, all vegetation is liable to injury, if not to total destruction from the attacks of insects which are peculiar to the plants they infest, also from blights which are caused by minute, in many cases, invisible plants, the lowest order of vegetable life, called Fungi. These are flowerless and therefore produce no seed, but are propagated by innumerable small organs called spores ; these are in a manner, detached from the parent plant when sufficiently mature and resting upon the various parts of the larger and more important families of plants, establish themselves as parasites on their various parts, eating their way into their tissues, using the very sap which nature had provided for the sustenance of the host, or plant to which they are attached, and by the mutilation and disturbance of the sap vessels, causing premature death and decay. Of such are the potatoe disease and all blights, rust and mildews. It is unhappily true that some horticulturists, of the old school, are careless and indifferent in the use of the means by which the dread consequences of the attacks of both insects and fungi can certainly be prevented. It seems strange that any one should be at the trouble of cultivating a crop carefully in every other particular, and then, by neglecting the use of insecticides and fungicides which are proved beyond doubt efficacious, should lose it. There are a number of these on the market, but as a destroyer of insects both as to effect and cheapness, according to the United States bulletin recently issued, none can compare with perfectly pure Paris green, which is a compound made up of three substances—arsenious acid, acetic acid, and oxide of copper. It is important to obtain the pure article because it is very liable to be adult-

erated or mixed in improper proportions and then the foliage of the crop to which it is applied will be scorched and blackened ; as the cultivator has no means of testing before using he should deal only with respectable firms and not be tempted to buy an article because it is a low price. A new compound called "Green Arsenoid" similar to Paris green is well spoken of and when mixed with a little lime has produced excellent results, "Paragreue" is not considered valuable.

In "London purple" too much arsenious acid is present in a free condition and causes scorching of the foliage "*Lead Arsenate*." Practical tests are greatly in its favor. "Slug Shot" and "Black Death" too dear.

As a "fungicide" the most important and certain in its effects is "*Bordeaux Mixture*," prepared by the action of lime water upon a solution of blue vitriol, (sulphate of copper).

Dry Bordeaux Mixture is on sale, but that which is mixed by having the lime and sulphate in separate solutions before putting them together adheres better to foliage and is chemically the best and cheapest.

The recipe has been so frequently published that it seems unnecessary to repeat it here, but the importance of its use, and being the only cheap and effective preventative of all fungous diseases of plants, should be sufficient apology for doing so.

To make Bordeaux mixture of the right quality, be particular in observing the following directions: Any variations may effect the chemical compound, rendering it less effectual or perhaps injurious. Mr. H. W. Wiley, Chief Chemist to the Bureau of Chemistry, Washington, U. S., says: "The way of mixing the two constituents of Bordeaux mixture has a very appreciable effect on its chemical and physical properties and the two solutions being dilute when mixed, a product will be formed which will stay in suspension and will adhere to the foliage much better than if both solutions were concentrated.

To make 100 gallons, take 10 lbs. blue vitriol, put it in a canvas bag and suspend it in about 10 gallons of water until dissolved which will take a day or two, then take 5 lbs. fresh slacked lime and dissolve in 10 gallons of water, stirring it frequently, then put the two solutions into one barrel and add 30 gallons of water, stir well and you will then have

enough mixture to spray thoroughly one acre, use only wooden or earthen-ware vessels, the vitriol will destroy metal. All crops liable to fungous disease can be saved from the attack, by faithfully spraying them with this mixture.

Another effectual way of preserving the crops from destruction caused by insects or fungous growths is to clear away all the weeds, cabbage stalks, potatoe tops or dead leaves immediately the crop is gathered, and to take care that no rotten fences or decaying logs should be allowed to remain, on which the spores of the fungi or larva of the insects can find lodgement in order to be in readiness to commence their attacks when the season for doing so arrives.

THIRD PART

FRUITS AND FLOWERS IN THE VEGETABLE GARDEN

The vegetable garden is neither the orchard nor the flower garden. Still to give variety and to please the eye and taste, the planting of fruits and flowers in the borders, is not without its utility. Under these conditions the useful and the agreeable become united.

As the space reserved for them in the garden is limited. We will in the first class only point out such as are of the greatest utility, and in the second, the flowers which please the eye as well by their verdure as by their beauty and are the most hardy, that is to say suit best in our climate, with the least amount of care.

CHAPTER ONE

Small Fruit Trees. — Gooseberry. — Red and White Currant. — Black Currant. — Raspberry.

THE GOOSEBERRY.—Is one of the first bushes to commence vegetation in the spring. It grows well in all kinds of soil and with any exposure. Still the fruit is always larger and sweeter from a soft sandy soil, slightly humid. The Gooseberry bush is propagated from seed or by cuttings and shoots. The last two methods are the most generally employed. Cuttings from old plants are replanted, or in the spring the twigs or branches of a parent root are bent so that they may be sunk some inches into a well prepared soil, being held in the position by a small forked stick, which is driven into the ground. If the earth used for covering the shoots is itself carefully covered with moss or dried grass to

retain the moisture, by the autumn of the same season they will have taken root sufficiently well to enable them to be set in nurseries and in one year later they will be strong enough to be permanently set out. It will often be advantageous to raise the end of the branch so buried in the ground, by means of a small picket, so as to force it at once to assume an upright position. Gooseberry bushes will not fruit before two years after planting.

To develop its growth the following system has been adopted, instead of allowing it to grow in tufts: At the end of the first year it has a stem of some inches in height with a few branches at the top. The three best branches are chosen to form the head of the bush; the others are cut off. On each of these three branches, only three buds are left and when these have developed only the strongest one is kept.

In the spring of the second year, the bush has the stalk or head with only three branches each having a number of shoots of various lengths; such of these shoots, as have three buds, are tipped. Two of the buds producing lateral branches and the third continuing the main branch. Afterwards, the bush should be pruned and the weaker branches should be removed altogether.

To assure the production of good fruit in abundance, the Gooseberry bush must be well manured every year and dead branches removed.

The Gooseberry is a round berry, sometimes ovoide, of a green, yellow or reddish color.

The enemies of the Gooseberry.—For some years past, a dangerous enemy has attacked our Gooseberries, the larva of a kind of insect, known in English as the saw-fly.

The saw-fly makes its appearance in the month of July, and if not immediately destroyed the crop is lost.

The best remedy against this dangerous enemy is white hellebore powder. The gooseberry and currant bushes attacked by these caterpillars should be watered from time to time with an infusion of this powder and in that way they are destroyed without any danger of the poisoned liquid remaining on the fruit.

Another and perhaps a more effective way for their destruction is to have the bushes carefully examined and the ova collected and destroyed before they have hatched.

The Varieties.—The varieties are : The Downing, Industry, Triumph and White Smith.

CURRENT BUSHES, RED WHITE AND BLACK.—The currant bush gives a most agreeable fruit, useful in the preparation of many dishes, preserves, jellies, etc. Of late years a fairly good wine has been made out of currants ; it becomes heady with age.

There are three kinds of currants, red white and black. The red are the most acid ; They are preferred for making jelly. The white make up in sweetness for the want of acidity. The black have a flavour exactly the same as the aroma of their leaves.

The principal varieties are :

REDS.—Red Dutch, the Knight, the Victoria, the Cherry.

WHITES.—White Dutch, very good for eating raw, the White Grape and the Prolific.

BLACKS.—Black English and Black Naples.

The propagation of the Currant bush is easy. Shoots of 6 to 12 inches long of the preceding year, cut from the wood and stuck into the ground in the spring have taken root by the autumn.

Currant bushes require the same attention as gooseberry bushes. They generally grow in tufts. However they do not suffer if by a special pruning they are forced to take the form of a small tree. As with the gooseberry the currant bush only fruits the second year after planting, with the exception, however, of the black variety which produces the first year.

Enemies.—Upon the first appearance of caterpillars, they must be destroyed by sprinkling with an infusion of powdered hellebore. It is well to prevent the evil by sprinkling from time to time from the 15th of June until the end of July.

RASPBERRY AND BLACKBERRY BUSHES.—Raspberries are an excellent table fruit ; they must be served fresh as they spoil quickly ; jellies and sirups are made from them.

The blackberry belongs to the same species and to the same family as the raspberry. There is little difference between them, except in the fruit, which is generally darker in colour and adheres to its core to such an extent that it can

hardly be separated from it without being crushed. Ripening later than the raspberry it continues in good condition for use until the plum season or that of the early apple.

Varieties of raspberries :

CUTHBERT.—Red fruit, very large and juicy, and yields abundantly.

GOLDEN QUEEN.—White fruit, fine flavoured.

CAROLINE.—Yellow fruit, much liked and yields abundantly.

OHIO.—Black fruit.

Varieties of Blackberries :—The Columbian, Lawton, Thornless, Black Caps.

Raspberry and Blackberry bushes should be placed in a corner of the garden, rather than in the borders, as they exhaust the ground and might injure the other plants.

• A light soil, well broken up and rather wet than dry is most suitable for their growth. The ground should always be kept clean and free from weeds. In the autumn or better, immediately after the fruit has been all gathered, the branches, which have produced the fruit, are cut down and the upper third of all the branches of the year should also be removed. The effect of shortening the latter is to cause them to fruit their whole length and to yield a larger berry.

Reproduction and Pruning of Raspberry Bushes.—

There is nothing easier than the increase of raspberry bushes by the countless shoots or suckers which they continually throw out from their roots. Branches will also take root by being laid in the ground. Some kinds, the black and white American, for example, set themselves as soon as the top of a branch touches the ground, but growing from suckers is the most common and simple method of reproduction.

Pruning raspberry bushes is a very easy matter because in many cases it is reduced to cutting down the branches which have produced the fruit, so that they will not interfere with the new branches which will themselves yield fruit later on. Nevertheless, to obtain fine, full flavoured fruit in abundance, besides requiring some care in cultivation, the raspberry bushes must also undergo the process of pruning. It consists solely in shortening each branch in the spring according to its strength and to the greater or lesser degree

of injury it may have received from the winter frosts, so as to prevent the loss of the sap in the weak and sickly parts and drive it to the buds from which the small fruit branches are produced.

Reproduction and pruning of blackberry bushes.—

After the gathering of the fruit, the fruit branches should be cut down and their existence terminated and also the ends of the young branches to about 7 or 8 inches from the ground, so as to cause them to branch out. The later branches should be nipped in the autumn at a length dependant on their position on the parent stem, those near the bottom being left longer than those near the top.

This method of pruning increases the number of the buds from which the secondary branches are produced and in addition brings them closer to the base from which they will receive the benefit of a larger quantity of sap and will be assisted to a stronger growth.

CHAPTER TWO

Hardy and perennial flowers — Rose — Piony — Phlox — Tulip — Mountain lily — Iris — Aster — Pansy — Narcissus.

Flowers, the same as other plants are divided into annual, biennial and perennial varieties. The annuals are those which flower the year they are sown and then die.

The biennials are those which produce only leaves the first year, flower the second year and last no longer.

Lastly the perennials are those, the roots of which, bulbous, tuberous, ligneous or herbaceous, last indefinitely and produce flowers every year.

Among the annuals some are entirely hardy open air plants, sown in the open ground in the spring in our climate they produce their flowers and ripen their seed during the season. Others are only half open air plants, that is to say are less hardy and must be sown in beds in the spring so as to produce their flowers in due season. As the space set aside in the borders in vegetable gardens is always small we will only refer to a few perennials and annuals, which may be sown in the open ground and will produce their flowers in the same year.

ROSE-BUSHES.—Rose-bushes although they are common, are no less the favorites of the public and to whatever variety they may belong, their flowers are always appreciated. Among the best known are the sweet-briar with a plain flower; the yellow rose, the Marshall Ney of a beautiful saffron-yellow.

The common double rose, large, a beautiful pink in colour and very fragrant. (Fig. 41.)



Fig. 41—Double Rose

In common with all other perennial plants, the rose-bush requires little attention besides the cutting away of some sickly branches and a little manure when the soil has become impoverished. Rose-bushes require an unmixed

soil, cool and well manured, especially with cow dung if the soil is dry and sandy. They will then grow vigorously and produce large numbers of flowers.

THE PIONY.—Chinese piones are among the most beautiful flowers of the garden. To the odour of the rose they join an almost infinite variety of colours.

The catalogues of floriculturists give the names of more than 200 varieties of garden piones; pink flowers, white centers, white with salmon coloured borders, etc., etc.

THE RED-GERANIUM.—A very pretty native plant, blood red, flowering early in the spring. Geraniums with pure white flowers require a somewhat shaded place.

THE PHLOX.—The Phlox is one of the most beautiful garden flowers, giving an endless variety of shapes and shades, varying also according to species and in time of flowering. (Fig. 42.)

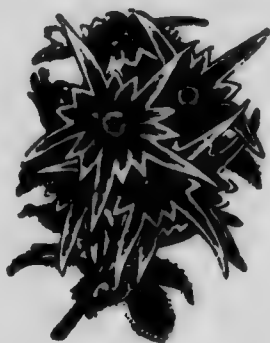


Fig. 42—The Phlox.

Phlox, with red, white, pink and crimson flowers.

Phlox, with creeping and spreading branches, tuberculated leaves, and pink and purple flowers.

Phlox, with spreading branches, flowers a lilac pink, leaves pointed.

Phlox, a creeper, with purple flower. There is also a species of phlox, an annual which produces charming little flowers of different shades.

THE TULIP.—The Tulip vies even with the rose for the title of queen of beauty among flowers. If the rose offers a

lighter and more delicate texture, the Tulip presents us with a larger variety of the brightest colours, blended in most pleasing harmony. It has a straight strong stem, a narrow cup and a colouring, the result of the blending of at least three bright and well defined colours on a white or yellow ground.

A loose unmixed soil, somewhat sandy, is particularly suitable for tulips. They are placed in beds or borders. September and October are the proper months for planting. They are propagated from the new bulbs which they produce.

THE LILY.—The spotted mountain lily has a woolly stem, produces bulbs; flowers are orange-salmon coloured, spotted or touched with black.

The Auratum Lily,—white, with purple at the base, a beautiful flower.

THE IRIS.—The iris has solid bulbs, easy to preserve in winter, provided they are kept clear of frost, by which they are easily affected. They are less liable to suffer from heat than dahlias; they may even be kept in ordinary living rooms, but the better way of preserving them is to place them in dry sand, as is done with dahlias. They are reproduced from new bulbs which they themselves furnish. They may, however, also be raised from seed.

Among the bulbs, flowering in the summer, the iris is distinguished by the elegance of its stem and the great beauty of its flowers. They are of every colour; in most varieties the petals are spotted, marbled or veined in different ways and the red, white, yellow and blue mingle and cross one another in a magnificent harmony of colour.

In a rich light soil the iris is planted early in the spring.

When the weather is sufficiently mild outside the planting is commenced. The plants are put down ten inches apart, at a depth of 4 to 6 inches. They must not be allowed to suffer for want of water and the stems must be supported by wooden stakes or by iron rods from 40 to 60 inches long. To prolong the time of flowering and to keep the plant in good healthy vigor, it will be well to give them a sprinkling or wetting with liquid manure, which should be done by opening the ground around each plant.

When very early flowers are wanted, the bulbs should be planted in pots to be transplanted into the open ground when there is no longer danger of frost.

SWEET PEAS.—They are in great request on account of their fragrance and the brilliancy of their flowers which are shaded in purple, dull red, bright red, blue, &c. They are annuals. (Fig. 43.)



Fig. 43—The Sweet Pea.

THE PERENNIAL ASTER.—According to the species and variety, the Aster reaches a height of 20 to 60 inches, forming a bush which in a very short time reaches considerable proportions. The stems are renewed annually by a great number of young shoots, perfectly straight which start from the foot of the plant and soon give it a very bushy appearance.

These stems are covered from the root to the top with dark green lance shaped leaves from 3 to 5 inches in length. The flowers are of moderate size and purple, yellow and violet in colour; they are more or less joined together in

bunches and have a fine appearance in September and October. These flowers are the more appreciated as they come at a season of the year when every thing will soon fade and wither.

The plants are easy of cultivation and only require a little manure to show extraordinary vigor. Asters are reproduced by slips, cut preferably after the winter so as not to interfere with the Autumn flowering

THE PANSY.—Pansies may be said to grow in all kinds of ground and in every exposure and appear to suffer from nothing but too much shade and moisture. Still they will always succeed better in a loose fertile soil in a bright and airy situation. In fact these conditions should exist if choice plants are to be handled.

There are many varieties of pansies notable by their size and colours. The pansy is a perennial.

THE NARCISSUS.—The narcissus gives beautiful flowers, most conspicuous, growing in bunches and forming splendid borders, flowering early in the spring : their varieties are :

The white with yellow crown.

The Golden Star, yellow with jonquille flower.

The deep golden yellow—large.

The pure white with pink crown.

The pure white, double, very fragrant.

The Incomparable, yellow and orange.

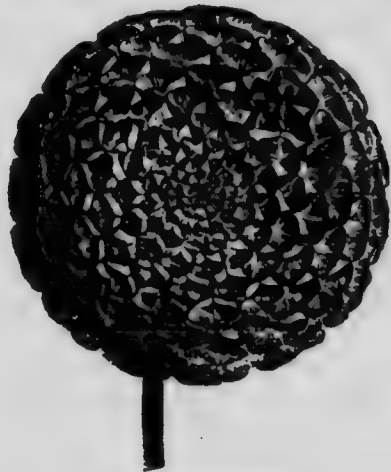


Fig. 44—The Zinnia

THE ZINNIA.—A magnificent plant, remarkable for the variety and brilliancy of its colours. It would be hard to find an annual, producing the same number of flowers with as little attention.

These flowers last until the first frosts.

THE MIGNONETTE (RESEDA).—The mignonette is a plant the sweet fragrance of whose flowers has given it a place in every garden. It should be sown in the second half of May:—as the germination of the seed is uncertain, in dry seasons it should be plentifully watered and the soil protected by a top dressing of straw.

Varieties: The mignonettes with large flowers.

The *Pyramid*, quite distinct from the other varieties, shaped like a pyramid, the flowers orange red in colour.

The *white*, the flowers almost white.

As the number and variety of flowering plants is unlimited, we will not attempt to name all which go to make up a flower garden. Our intention was simply to point out such as were suitable to give variety in a vegetable garden when sown or planted between or among the fruit bushes.

As a general rule none of these plants require much cultivation; a loose light soil, well covered with mould, weeding when necessary and watering during very dry weather will generally give satisfactory results.

When plants grown from seed are strong enough they should be thinned and transplanted elsewhere in the garden, if thought advisable. A dull or rainy day should be chosen for the transplanting which invariably is successful if ordinary care is shown. If the plants are delicate, they should not be entirely separated from the soil; they should be taken up with a portion of the soil adhering to them, which is called taking them up with their clod. For seeds and bulbs which may be required the seedsman is the proper person to whom to apply and he will be pleased to send his catalogues.

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